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On CERTAIN RESULTS and DEFECTS of the REPORTS of the REGISTRAR-GENERAL. By WILLIAM LUCAS SARGANT, Author of "Social Innovators and their Schemes," "Science of Social Opulence," &c.

[Read before the Statistical Society, 16th February, 1864.]

THE principal conclusions at which I arrive in the following paper are these :—

1. Comparing the last decennial period (1851-60) with the previous one (1841-50), the improvement in the rate of mortality is very small, and is far from fulfilling the expectations of sanitary reformers, p. 175. The excess of mortality in towns as compared with that of rural districts, is an evil too deeply seated to be corrected by improved drainage and water-supply, p. 177.

2. The rate of mortality among young children has been greatly exaggerated ; partly through an erroneous mode of calculation, p. 181.

3. The infant death-rate of London is low : the death-rate of London children *past* infancy is singularly *high* by comparison, p. 198. The Bethnal Green statistics are remarkable, p. 199.

4. The rate of farm wages has little comparative influence on the death-rates of counties, p. 184.

5. Dr. Gairdner's opinions published in the "Social Science Transactions for 1860" are unfounded, p. 204—207.

6. The *male* death-rate is the true test of comparative mortality, p. 179.

7. In comparing one place with another, the *ages* of the inhabitants must be taken into account. More deaths will happen in a healthy foundling hospital than in an unhealthy barrack, p. 173.

8. The *classes* of society must also be taken into account. It is useless to compare Whitechapel with Clifton.

9. In comparing one town with another, we must take the *borough* and not the parish which bears the name of the borough. The Registrar-General takes the parish in some cases ; and in other cases a large district with the town for its centre, p. 187.

10. Neglect of the precautions mentioned in 6, 7, 8, and 9, has led to some false inferences. Of the very great provincial towns Birmingham is the healthiest : but the Registrar-General represents it as *less* healthy than London by $\frac{2\frac{1}{2}}{1000}$ or $\frac{3}{1000}$; I contend that it is considerably *more* healthy than London, pp. 203, 204.

11. Some alterations are required in the Registrar-General's Reports. Every volume ought to have a preface with instructions to

inquirers: with examples of modes of calculating the rates of mortality: with the latest life table, male and female, or notice where to find it, pp. 207—210.

The boroughs ought to have their mortality given: and the substitution of parishes and districts in the places and under the names of boroughs ought to be abandoned.

The tables occasionally given, *e.g.*, at XX, xix, should be explained in an intelligible manner, p. 196; and a distinction should be drawn between the two modes of calculating the death-rates:—viz. from the number left alive, and from the number exposed to the risk of death, p. 181.

A better and fuller 10 years' volume is wanted, with male and female population distinguished; and with columns of percentages of every district, sub-district, and borough, pp. 207, 208.

Introduction.

The title of this paper indicates my intentions in writing it. I have presumed to think that the Registrar-General fails to supply us with some results that it is important for us to know; and further, that the returns themselves are as yet imperfect. The general excellence of the reports is confessed by all; and if I had undertaken the task of forming an estimate of their value, I should have had to perform the first and most pleasing duty of a critic, by praising the copiousness of their materials and the lucidity of their arrangements. The task I have set myself is a far humbler one: it is to call the attention of this Society to some parts of the reports which, as I have found, present needless difficulties to inquirers; as well as to suggest and partly supply final results hitherto withheld.

When the system of registration was established more than a quarter of a century ago, the first object proposed was, to furnish Parliament with facts necessary for sound legislation as to the marriages, births, deaths, and health of the people. This object has undoubtedly been to a considerable degree attained. The conclusive evidence supplied of the comparative unhealthiness of towns, has led to sanitary measures which have not altogether failed to lessen the reproach. The standard of average mortality deduced from the registers, demonstrated the murderous waste of life that had long been going on in our barracks; and introduced changes which, we are told, have greatly lessened the evil. I wish it were found possible to go a step further, by carrying into effect the authoritative suggestion of employing the soldiers in trades. Perhaps it is to the same ascertained standard that we must attribute the present movement in favour of our Indian army: though to condemn its sanitary management it was unnecessary to go farther than our own barracks, which, unhealthy as they were, were palaces of health compared with

those of India. On the whole then, the Registrar-General's office has not been barren.

The reports however, are mines to be worked by men who are not legislators. All students of social economy should naturally resort to them for materials: so should those who want sanitary information as to a county or a town; particularly the members of town-councils. To such inquirers the greatest facilities ought to be given, by an intelligible arrangement of the tables, by copious indexes, and by preliminary instructions. I shall have to point out many deficiencies in these respects.

Prudence compels me to confess that many errors may be found in the schedules I have appended. The calculations I had to make were so numerous as to occupy part of every day during six months; and I know by experience that I cannot attain perfect accuracy: but I do hope that there is no blunder of sufficient importance to vitiate my conclusions.

I.

In the appendix will be found three Tables, A, B, and C: I will proceed to explain these, column by column.

Appendix A.—Table A has a series of figures relating to all England and Wales, to London, to 39 English counties, to the three ridings of Yorkshire, as well as to North Wales and South Wales, each reckoned as one county.

Column 1—contains simply the population of each division as determined by the recent *census*.

Column 2—contains the population of each division as given by the Registrar-General. An uninitiated person is surprised to find that these two enumerations vary considerably: Bedfordshire for example appearing in one column with 5,000 more persons than in the other column; Berks with 30,000 more. The explanation is this:—the Registrar-General, on commencing operations in 1837, instead of dividing the country anew, adopted the districts already formed by the Poor-Law Board; and these divisions, made for the convenience of pauper management, occasionally absorbed a corner of one county in a union of another county. Such allocations, if well explained in the registers, would not be inconvenient. But at present they are not well understood except by experts, because no warning to inquirers is prefixed. Thus, if I want to find Edgbaston, I look in the index, but it is not there: I search through the sub-districts of Warwickshire, but in vain: if I possess unusual patience I discover my parish at last removed from its own county to Worcestershire. I have now learnt the lesson which a preface ought to have given me; but a casual inquirer generally shuts the volume for ever. This evil would be easily remedied.

Columns 3 and 4—give the density of population in each division. We all know that a town life is unfavourable to health, and that a closely packed population has a high rate of mortality. In column 3 we have the number of acres to each person: the number being for all England and Wales less than 2; for London $\frac{1}{10}$ th; for Westmoreland nearly 8; for North and South Wales 4 to 5. But this test of crowding is imperfect; because a particular division, North Wales, *e.g.*, with 5 acres to each person, might have 4 acres taken up with hills and wastes and waters; while the inhabitants were generally packed in a few towns. Column 4 is intended to correct this possible error: I constructed it by adding together in each county, the population of all the towns enumerated in the census, and then comparing this total urban population with the total rural population of the same county. I find that in Bedfordshire, Cambridge-shire, the North Riding, and some other parts, the rural population is about twice as great as the town population; whereas in North Wales it is eight times as great, in South Wales and Westmoreland four times as great, in Huntingdonshire and Rutlandshire three times as great: that in Nottinghamshire, Worcestershire, the East Riding and the West Riding, the town and the country are about equal; but that in Lancashire, Warwickshire, and Surrey (extra metropolitan) the rural population is only half that of the towns. And this column No. 4 does not give the same results as the previous column of acreage to persons; as may be seen by comparing Westmoreland and Wales. I have perhaps made a mistake in taking all the towns in the census, *i.e.* all towns of 2,000 inhabitants and upwards: if time and patience had permitted, I would have given other columns limited to towns of 5,000, 10,000, or 20,000. I believe however, that column 4 as it stands supplies a better test of crowding or sparseness, than does column 3 with only the acreage per head.

Column 5.—In the fifth column I copy from the census the decennial increase of the counties; which is great in some, and small in others, while in five instances there is a decrease. The high rate of increase is generally found where great towns prevail; though there has been a marked increase in some counties in which, as seen in column 4, the rural population is greatest; as in Essex, Herefordshire, and Wales.

Specific Mortality.—One point is here deserving of attention. The ages of persons living and dying in one place vary considerably from the ages of persons living and dying in another. Dr. Price, in the absence of any enumeration, conjectured that in consequence of the large immigration of young persons, the towns contained a superabundance of the healthiest ages; and he contended that the numerous deaths in towns were the more disgraceful on that account. On the other hand it might have been guessed that the

adult immigrants soon married and had a brood of children, and by the inevitable prevalence of deaths among these children, increased the apparent mortality of the towns. In a foundling hospital which only retained the children till 5 years old, the death-rate would be numerically high, however healthy the children might be; and a town with an abnormal number of young children would in that respect, though in a low degree, resemble a foundling hospital. A high numerical mortality so caused, would not prove unhealthiness. Dr. Price's conjecture and the antagonistic conjecture could be tested only by a comparison of facts.

Seven or eight years ago,* I spent some time in comparing what I ventured to call the *Specific Mortality* of all England, Cornwall, London, Liverpool, Manchester, and Birmingham. I must content myself with stating that I found the differences less than I had suspected: that taking 1,000 deaths as the standard, Cornwall was worse than it appeared by 18; London was worse by 29; Liverpool (much damaged by cholera and Irish famine) was worse by 68; Manchester was better by 9, and Birmingham was better by 28. Thus, comparing the two extremes, London and Birmingham, there was an appreciable difference of $\frac{57}{1000}$, or nearly $\frac{1}{18}$ th part.

A misunderstanding of this principle has made it appear as an apology for parental neglect. Now there are two ways in which a place may have a high infantile mortality:—the first is the existence of an abnormally large number of infants; the second is the prevalence of parental neglect or other circumstances unfavourable to infant life. The former is the case with which we are now dealing. But in no case can the deaths of 1,000 infants be held to indicate the degree of insalubrity which the deaths of 1,000 youths indicate.

Column 6—gives the number of persons living on an average in each house. On this I have only one remark to make:—that though a low average is generally satisfactory, as showing the possession of a separate house by each family, yet a higher average is in particular parishes a result of opulence; because among the richer classes the family is increased by the domestic servants; so that in St. George's Hanover-square for example, a high average in a house does not indicate crowding as it does in Shoreditch.

Columns 7 and 8—supply the rate of mortality in each county, as well as for London and for the whole country: first for the ten years ending at Christmas 1850, and then for the ten years ending at Christmas 1860. The former I have had to calculate for myself: the latter I copy from the table of the register (XXIII, xiv).† By

* "Economy of the Labouring Classes," 445.

† The Registrar's figures are slightly different from mine. The death-rate is commonly reckoned to be $\frac{10 \text{ years' deaths} \times 100}{\text{average population}}$, giving for all England and

glancing from one to the other, we can judge of the sanitary progress in each county.

For all England and Wales the death-rate during the earlier period was 22·28 to the 1,000: during the latter period it was 22·16. These two numbers approximate so nearly as to prevent us from claiming any palpable improvement during the second decade. Nor shall we derive any comfort from going back to an earlier register; for the death-rate from the commencement of the register to 1845 was only 21·76, a number lower than those I have given by about $\frac{1}{50}$ th part. Remembering the inevitably crude state of the registers in their earlier years, I think little of this second comparison; but on the whole I feel that the absence of progress is a severe disappointment. While by a few years of earnest effort the mortality among our soldiers has been reduced to a comparatively low rate from a shamefully high one; while we confidently hope that an equal or a greater improvement will soon be effected in our barracks abroad; we have to confess that our boards of health, our inspectors of nuisances, our millions spent on drainage, our grand aqueducts and our subterraneous rivers, have left us to die as we died before. We still hear that this place has ceased to be a charnel-house since its thorough drainage was completed; that the closing of the cellar-dwellings has saved thousands of lives annually: but when we get at the totals of the kingdom, we have lost in one part what we have gained in another.

Even under this discouragement I do not regret the costly efforts which we have made to purify the country. It is in itself an excellent thing to banish filth and stenches and to secure a purer water to drink. Besides, though the number of lives saved has not been large enough to tell sensibly on the registers, yet the most miserable of our people must have been spared much suffering and some demoralisation.

The percentage in our favour too, is somewhat larger than it looks. Our population becomes in each decade more urban and less rural: we ought to learn whether this variation accounts for our slow progress.

Of the increase of two millions from 1851 to 1861, far more than half belongs to the counties in which there is a prevalence of towns or mines: to Middlesex, Kent, Surrey, Hants, Lancashire, Cheshire, Staffordshire, Warwickshire, Durham, Northumberland: and even in

Wales 22·16 against the Registrar's 22·24; and for London 23·63 against the Registrar's 23·77. For the purpose of comparison with previous periods the difference is worth noting. The difference is caused by the Registrar-General's including in the average the intercalated years, instead of confining the calculation to the two extremes from which the intercalated years are reckoned. This mode is more accurate, but too tedious for ordinary purposes.

counties which have a predominance of rural population, as Cornwall, Derbyshire, Northamptonshire, the increase may have taken place in towns. But let us see what result would follow if we assumed the whole 2 millions of increase to have taken place in towns; and if we assumed further that at the penultimate census of 1851, the town and the rural population were equal. We should then have,

In 1851	9 millions in towns,	9 millions in the country.
" '61	11 " "	9 " "

If we turn to the Register XXI, xxx, we shall find the population divided in a similar way, but with a considerable preponderance of rural population. The respective rates of mortality are set down as 20 and $26\frac{1}{2}$. Assuming the same difference from 1851-60, the calculated death-rate of $22\frac{1}{4}$ gives 19 for the country death-rate and $25\frac{1}{2}$ for the town. The account will then stand thus :

Assumed Mortality :—

1851	9 millions of town at $25\frac{1}{2}$ and 9 millions of country at 19	Average. $= 22\cdot25$.
'61	11 " " $25\frac{1}{2}$ " 9 " "	19 = $22\cdot58$.

From this it follows that on the assumptions I have made, the last decennial death-rate ought to have been '33 in the 1,000 worse than the previous decennial death-rate. But the case is not really so strong as this; and even after allowing for the small improvement exhibited in columns 6 and 7, the advance is too trifling to be worth notice: for if the year 1860, instead of being a favourable one, had been as unhealthy as 1854, the improvement for the 10 years would have disappeared. Any conclusion founded upon so slight a variation, is open to the censure passed by Professor Radicke on rash inferences in the case of medical observations.

For the sake of simplicity I assumed that the decennial increase of 2 millions took place in towns; but it should be observed that so large a part as 840,000 was added by London and Lancashire; and further, that the fall in the death-rate of both of these was so considerable, that the two together did not weigh more heavily in the scale during the second period than during the first.

I am obliged to conclude therefore, that the result of our national efforts for purification has been, as regards the death-rate, something like a failure; and that it has by no means realised our magnificent expectations of reducing the mortality of towns to that of the country as it was, and of reducing the mortality of the country to that of Grayrigg in Westmoreland, or of Calbourne in the Isle of Wight.

I have for some years suspected that too much stress has been laid on external causes of death; particularly on bad drainage and

impure water : and that any great general reduction of mortality must be effected by means far different from the laying out of millions, or scores of millions, of money. As to towns:—people generally live and work under cover. Now Mr. Neison has long inferred from his observations on friendly societies, that the difference of longevity in town and country, is not principally caused by the quality of the air breathed: for he has found that sedentary pursuits in the country are something like as injurious as they are in towns. It is not so much *country* air that is wanted as *open* air. But I have no hope of inducing our mechanics to pull out their glazed windows: nor am I sure that they could do their nicer work with numbed fingers. Much less could we get textile factories thrown open. And I see no other way of giving to in-door occupations the salubrity of those carried on out of doors.

Then as to both town and country, there are the questions of habits, of morals, of education. Improve these, and mortality will diminish: but how slow is the progress! I do not despair of raising the working classes to the present level of the middle classes, and I hope that my great-grandsons may see the improvement. Happily, such a change would probably be permanent; and I no more fear that, in the ordinary course of events, the lower classes once raised will sink again, than I fear that the educated classes will relapse into the drinking, swearing, practices of their grandfathers.

Comparing our death-rate with that of other countries, we have moderate grounds for self-gratulation. We much surpass Russia and Germany; and our small superiority over France is augmented by the necessary allowance for the greater prevalence of our towns over our rural districts. If we go to Sweden, we find that its long-continued and accurate statistics prove a lower mortality than ours (*Statistical Journal*, xxv, 111); but the paucity of Swedish towns vitiates the comparison; and a separation of the town and the country (*Id.* p. 169) shows that the Swedes are inferior to us, especially in the towns. Norway, we find, during 30 years had the low death-rate of 18, a singularly favourable condition even for a purely agricultural people. Belgium from 1841-50 had a death-rate little exceeding ours.

Coming to those parts of our own country not included in the Registrar-General's Reports, Ireland has only now the first promise of a register. It has been conjectured that its mortality, in the absence of famine, is low: a strange result, if it be such, of chronic squalor and destitution.

Scotland has had a registration during several years, and the returns are remarkable. The lower Scotch, compared with the lower English, are a dirty people; worse housed, more addicted to spirit drinking, and exposed to a severer climate: yet they live

longer. Our Registrar-General attributes this superiority, as I have attributed that of Sweden, to the less prevalence of town populations; but the explanation is questionable. Scotland indeed, has no metropolis of three millions, but Glasgow is as large to Scotland as London is to England. Edinburgh weighs as heavily in the Scotch scale as the aggregate of two or three of our large towns in the English scale. Comparing the two registers (Scotch Register IV, xxviii and English Register XXI, xxx) we find that the Scotch town population is more than a third of the whole, and the English town population is less than a half ($\cdot 37$ to $\cdot 46$): a trifling difference. Some allowance however, is due to the fact that the mortality of towns is apt to increase in a geometrical ratio as the numbers increase; though this is not true of our greatest town, London.

Let us now appeal to the Scotch Registrar. In his Fourth Report (pp. xxv and xxviii) he says that in the Insular Districts the death-rate is only $14\cdot6$ in the 1,000. This applies to 162,000 persons; a number relatively equal to a million in England. We find no such low rate among ourselves. Little Rutland, with 23,000 has a death-rate of $\frac{1\cdot8}{1000}$: Surrey with 273,000 and Westmoreland with 61,000, are above $\frac{1\cdot8}{1000}$. Thus 357,000 people in the healthiest of our counties have a death-rate of 18 at least: an excess of a fourth above that of the Scotch insular districts.*

The Scotch mainland rural districts have a death-rate of $\frac{1\cdot7\frac{1}{2}}{1000}$, and these contain more than half the population. Our rural districts have a death-rate of 20; *i.e.* an excess of $2\frac{1}{2}$ above those of Scotland. (English Registrar-General XXI, xxx.)

On the other hand, our town districts have a death-rate of only $25\frac{1}{2}$ against $26\frac{1}{2}$ in the case of Scotland.

I therefore conclude that notwithstanding dirt, cold, and whiskey, the north of our island has a decided superiority to the south, in the rural districts, but some inferiority in the towns. It appears also, that a Scotchman by migrating from the country to the town, loses more than an Englishman does by the same change; the Scotchman losing $\frac{2}{1000}$, the Englishman only $\frac{5\frac{1}{2}}{1000}$: and perhaps it is here that the dirt and the whiskey produce their fatal effects. The farm-wages of Scotland are now something higher than ours, but there is not any notable difference. It is worth inquiry whether the superiority of Scotch education, as shown by the marriage signatures, is not an important element in the estimate, especially with reference to the judicious treatment of infants. London, with a comparatively

* From a paper read by Dr. Farr before the Royal Society, 7th April, 1859, it appears that in the "Healthy Districts" of England, from 1849-53, the death-rate was $\frac{1\cdot7\frac{1}{2}}{1000}$. See p. 864.

high state of education, and a low infant mortality, strengthens this presumption.

Column 9.—My next column gives the death-rate of males only. The Registrar-General in one of his earliest reports, propounded an opinion, that the respective occupations of the two sexes made the female death-rate more uniform than the male. The reverse seems to me to be true.

If we compare one place with another, we find that the proportion of males to females varies greatly, though in most cases the women are the more numerous. The excess of females is occasionally very large. It is not the manufacturing districts which furnish the most remarkable examples: for Manchester, Salford, Bradford, have a female excess of only 11 to 15 per cent.; while Birmingham has only 5 per cent., and Sheffield has even a small excess of males. It is in the parishes where persons of independent means congregate that the disproportion is most marked: as, for example, in St. George's Hanover square, where females predominate by 34 per cent., and females over 20 years old predominate by 44 per cent.; and still more in Leamington which has 43 per cent. more females, in Edgbaston parish which has 45 per cent. more, and in Clifton which has 73 per cent. more. It needs no argument to prove that the larger part of this surplus consists of domestic servants.

Now it has long been remarked that this introduces a disturbing element into the calculations of mortality. Domestic servants are for the most part of very favourable ages; with the sickly members eliminated; to a great extent immigrants from other parishes, who seldom die in service, but rather in their relations' houses or in hospitals. Therefore, for such places as Hanover Square or Leamington, the male mortality is the more instructive. I will pursue this topic further when I explain my Tables B and C, of town populations. I will only remark now, that the excess of females over males for all England is rather more than 5 per cent.; that the excess in London is almost 15 per cent.: that the male death-rate for all England exceeds the general death-rate by only 8 in 10,000, while the excess in London is 19 in 10,000. It appears therefore, that the female servants in London much disturb the general death-rate; and that resorting to the male death-rate as the truer test, London instead of being only $1\frac{1}{2}$ worse than all England, is more than $2\frac{1}{2}$ worse.

In a few of the counties, the male and the female death-rates vary singularly. In Bucks, Northamptonshire, and Rutlandshire the male death-rate is less than the female: in Derbyshire and Durham they are nearly uniform.

Dismissing the comparison, and looking at the male death-rate

only, we find that of the counties, Lancashire is the worst with $27\frac{1}{2}$: then come Staffordshire and the West Riding with 25; Warwickshire with 24; Cheshire, Durham, Monmouthshire, Northumberland, Nottinghamshire, and the East Riding with 23. It will be asked whether this male death-rate does not increase, just as the prevalence of the town population increases. My column 4 enables me to answer that this is not so. Lancashire and Warwickshire have just the same proportions of town to country, but their respective male death-rates are $27\frac{1}{2}$ and 24: London is nearly all town, but its male death-rate is almost 2 less than that of Lancashire, which has a considerable rural district.

The best counties as to male deaths are Rutland and Surrey with 18; Westmoreland with 19; Dorsetshire, Essex, Herts, Lincolnshire, the North Riding, Salop, Suffolk, and Sussex, all with 20.

But here is another defect, as I think, in the Registrar's volumes. In order to calculate the male death-rate, we must know the number of male deaths and the number of males living. The register supplies the one but not the other. The male deaths are scrupulously recorded; but the male population is not separated from the female. To have to refer to the census is a trifling obstacle to me, but it is a formidable obstacle to an occasional inquirer. And even on me a wearisome task is imposed.* The census very properly furnishes a multitude of particulars but not the totals. For example: to calculate the male death-rate of Bolton, I ascertain from the Register, XXIII, 234, that Bolton lost in 10 years 17,028 males: but turning to the census for the male population, instead of finding this given in one line, I learn that Kersley township had 2,043 in 1851 and 2,424 in 1861; that Farnworth had 3,085 and 4,113 respectively; and so on through every sub-district and every minor division of every sub-district of which the district of Bolton consists. To get my totals I must add up two columns each containing 30 lines. The register ought to supply these totals. The case of York is worse; for it requires the adding up of two columns each of 96 lines: and Chester has two columns each of 120 lines. The counties fortunately, have the totals given (Census I, 194), but these should be copied into the register.

Column 10.—I arrive now at columns which raise questions of peculiar interest:—I mean as to the death-rate of young children. Sanitary reformers, in their zealous advocacy of improvements, have

* I leave this passage as I read it to the Society; but the totals have been pointed out to me in another part of the census. I had trusted too implicitly to the census index, which gives no reference to the places where the totals occur. The logical arrangement of the census is excellent; but for reference a full index surpasses the best logic.

made statements of a shocking character. Seventy years ago, Arthur Young told his readers that the London Foundling Hospital made it a boast in 1756, that only three-fourths of the children died in the year. We learn also from official authority, that in Dublin about the same time, the Foundling Hospital lost nearly half the children even before they were sent out to nurse. As to the present day, loose statements are made, about a frightful mortality in some parts of England. Dr. Gairdner, an eminent Edinburgh physician, asserts ("Social Science Transactions, 1860," 644) that in the great towns far more than one-fourth of the infants die in the first year. In an early number of the *Journal* of this Society (v, 230), appears a calculation made by the Secretary of the Poor-Law Commissioners, from which it appears that among agricultural labourers, artizans, and servants, half the children die under 5 years old. Such assertions though authoritative are baseless; but a hundred pens reproduce them.

I am acquainted with three modes of arriving at these inaccurate results :

1. The first of these consists in calculating the mean age of those who die, and in assuming that as this age is high or low, the rate of mortality is high or low : it overlooks the fact that in whatever institution, or neighbourhood, children are unusually numerous, the mean age of the deaths *must* be low.

2. The second mode is founded on the proportion of young deaths to all deaths. In England, the male and female deaths under 5 years old, are about two-fifths of all deaths. The false conclusion is drawn, that two-fifths of the children born, die under 5 years.

The Registrar-General has condemned both these modes, and has pointed out that they both omit the consideration of the number of children living. With a given condition of health, the number of deaths must be in proportion to the number of children among whom deaths can take place.

3. But as far as I know, the Registrar-General has not condemned the third mode. This consists in calculating the deaths from the number of persons left alive, instead of from the number who have been exposed to the risk of death.

If 1,360 new-born infants are placed in an asylum on the same day, and if their number is reduced by death, in 5 years, to 1,000, the quinquennial death-rate is $\frac{360}{1360}$ or $\frac{265}{1000}$; but the mode I condemn would call the death-rate $\frac{360}{1000}$. The difference between 265 and 360 is very large. I give this imaginary case merely as an illustration of the *principle*.

The case I originally gave was a different one, and assumed the introduction of new-born infants from time to time, to fill up the gaps in the numbers. To this it was objected that the infants so

introduced after the first day, were not exposed to the risk of death during the whole 5 years.

The question is, I confess, a very difficult one : to discuss it fully, would require more space than I have at command. But those who object to my proposed mode, have two points to consider. First, my proposed mode, applied to the Census of 1851 and 1861, gives a result as to childrens' deaths pretty nearly the same as the result deduced from the births : secondly, my proposed mode gives a result not very far from the same as that in the life table (Registrar-General, XII). On the other hand, the results obtained by the mode I condemn, very wide of those deduced from the Censuses, and from those of the life table. Judged by results, my mode is right, and the other is wrong.

My column 10 gives the death-rate of male infants under 1 year old ; and I will first enumerate the best of the counties in order of merit. In all England the deaths to 1,000 are 161 : in Westmoreland 104 ; Rutland and Surrey (extra metropolitan) 126 ; Hants, Sussex, and Devon 130 ; North Wales 131 ; the North Riding 136 ; Herefordshire and South Wales 137 ; Cornwall, Cumberland, and Herts 139 ; Kent and Middlesex (extra metropolitan) 141 ; Salop 142 ; Oxon 145.

In order of *demerit*, (against 161 for all England) we have Lancashire 192 ; Staffordshire 182 ; East Riding 181 ; Notts 180 ; West Riding 177 ; Warwickshire 176 ; Leicestershire 175 ; Norfolk 174 ; Bedfordshire and Cambridgeshire 172 ; Cheshire 170 ; Huntingdonshire 164. London has only the same number as all England ;—161. This is for the first year of life, and for boys only : the deaths of girls are fewer by far.

Column 11.—I now come to the deaths in the 2nd, 3rd, 4th, and 5th years of life ; *i.e.*, of children under 5 omitting the first year. We might expect to find that this column would follow the proportions of the last ; that counties fatal to infants, would be about equally fatal to children past infancy : but this is not altogether the case. The most remarkable exception to uniformity is London, which loses only about as many infants as the whole kingdom, but which loses nearly *one-third more* young children (over 1 and under 5) than the whole kingdom. I will reserve my remarks on this example till we come to Table B.

There are several counties which vary in the opposite direction : *i.e.*, in which the infants die relatively faster than the young children. Bedfordshire, Cambridgeshire, and Norfolk, are examples. Column 14 gives the ratio for each county, and I shall come to it immediately.

As to the absolute number of deaths of young children over 1 and under 5, the rate per 1,000 is as follows. All England and

Wales 105; London 137; Rutland 56; Westmoreland 64; the North Riding 66; Herefordshire 67; Suffolk 69; Lincolnshire 70; Herts 73; Huntingdonshire 74; Norfolk 76; Salop and Somerset 77; Dorset and Sussex 79; Wilts, Oxon, and North Wales 80; Northamptonshire 81; Surrey (extra metropolitan) 84.

The bad counties come thus. All England 105; Lancashire 144; London 137; Staffordshire 126; Warwickshire and Monmouthshire 113; Durham and the West Riding 111.

Column 12.—My next column includes the results of the two previous ones, by giving the death-rate of children from birth till 5 years old.

I have already mentioned the exaggerated statements made on this topic, by persons who erroneously believe that in some places half the children die under 5. I shall show presently that this is not true of the worst town in the worst county; and is far from being true of any other place.

The worst counties lose as follows. All England 266; Lancashire 336; London 298; Staffordshire 308; Warwickshire 289; the West Riding 287; Durham and Notts 275; the East Riding 272; Cheshire 271; Leicestershire 268.

All these numbers are for boys only: a return of boys and girls together would be more favourable. Then we ought carefully to recollect that the prevalence of towns in any county makes a high death-rate inevitable. In Lancashire and Warwickshire the town population is more than twice as numerous as the rural population (100 to 43): whereas in Leicestershire the rural population is much in excess (137 to 100).

Column 13.—Some persons would feel sure that the death-rate of children in each locality, would follow the general death-rate of the same locality. Other persons would expect an abnormally high juvenile death-rate in places where women are employed away from home. It may be true also, that particular climates are favourable to one age rather than another: that the mildness of South Devon may spare the fragile constitution of infancy, while the severer air of Yorkshire may brace the nerves of parents. My column 13 is an attempt to make the comparison between the infantile and the general death-rate.

In all England and Wales, the death-rate under 1, is 7 times as great as the general death-rate: in London it is over $6\frac{1}{2}$ times as great (6·26); Bedfordshire goes up to 8 times; Lincolnshire and Cambridgeshire about the same; Northamptonshire nearly the same; Norfolk, Notts, the East Riding and Leicestershire to a little under 8. London as we have seen, stands singularly low (6·26); yet Hants is still lower (6·19), and Devonshire is as low as London. Many other counties are a good deal lower than the average of England.

Still confining our attention to the ratio of infantile to general death-rate, we see that it is not in the great manufacturing counties that the ratio is high. Even Lancashire with its frightful loss of infants, loses its people of other ages in equal proportion.

Column 14—is the one to which I referred, in commenting upon columns 10 and 11 : it is a comparison, not of young with all ages, but of young with young. I was led to it by the remarkable contrast in London, between the mortality of infants and the mortality of other young children.

I will use the word infants here in the sense of all children under 1 ; and the word children for all children over 1 and under 5. Comparing, throughout the country, the deaths of children for the four years with the deaths of infants for the one year, they are 65 to 100 ; so that for each year on an average they are only one-sixth as numerous. Against 100 infants all England loses 16 children each year : London loses 21 ; Lancashire, South Wales, and Monmouthshire 19 ; Devon and Hants 18 ; Northumberland 17½. The low ratios are in Lincolnshire, Norfolk, and Rutland, 11 ; Suffolk, Northampton, the North Riding, Herefordshire, and Bedfordshire, 12 ; the East Riding, Bucks, and Cambridgeshire, 12½. We must remember that these are only proportions : Devon, *e.g.*, stands unfavourably, not because it loses many children, but because it loses very few infants ; and London looks far worse than Lancashire partly because it loses more children ; to a great degree because it loses far fewer infants.

Column 15.—I have added two columns for the convenience of those who are disposed to conjecture the causes of the varying mortality. The first gives the rate of farm-wages in recent years, according to Mr. Purdy's valuable paper. (*Statistical Journal*, xxiv, 328.) We know from other documents,* that the middle and upper classes are longer-lived than the labouring class ; and that this is especially true of children. We naturally inquire whether within each class the more affluent are longer-lived than the less affluent : whether, *e.g.*, the well paid labourer lives longer than his ill paid brother.

There are two distinct kinds of labourers, the town and the country : we know that town wages are far higher than country wages ; we know also that town mortality is not lower, but far higher, than country mortality. So far the deaths increase with the affluence. But the superiority of country labourers is probably owing to their working out of doors, and not to their low remuneration. It is probable at the same time, that the high wages of many

* See Vital Statistics of the Society of Friends in *Statistical Journal*, xxii, 221 : and of the Peerage in *Statistical Journal*, xxvi, 54.

artizans shorten their lives by furnishing an excessive allowance of beer and spirits.

The really valuable comparison however, is between one town district with another, and between one rural district with another. Of all the counties, Northumberland, Cumberland, and Westmoreland, have the highest farm wages; and the male mortality there is pretty good, good, and very good, respectively. The four counties in which the farm wages are lowest, are Devon, Dorset, Wilts, and Hereford; and in all these the male death-rate is at least good. Taking the aggregate death-rates of these seven counties, the ill paid are to the well paid as $\frac{2}{3} \circ \frac{5}{9}$, giving a trifling advantage to the ill paid. Among children under 5, the ill paid have also a small advantage, as $\frac{2}{3} \frac{1}{2} \frac{1}{4}$. No one will suppose that the low wages of the south are the cause of this trifling superiority; but I think we must infer that even these miserable wages are sufficient in the south to maintain health. The average wages of the three highest counties are 148. 5*d.*: those of the four lowest are only 98. 3*d.*; a difference of more than 5*s.* a-week. Gladly therefore, as I would see an augmented rate of wages among the southern labourers, I cannot hope that the improvement would of itself much lessen the rate of their mortality.

(I should mention that my averages are struck roughly, by counties, and not by the aggregate populations of the counties, *i.e.*, Devonshire for instance, with a population of 584,000, counts for as much as Herefordshire with 124,000).

Column 16, the last of this table, gives the number of women in each county who sign the marriage register: a test of education generally accepted as the most accurate we can get. I have given the women's signatures rather than the men's, because the state of instruction of mothers has the more direct bearing on the health of children.

It is remarkable (Registrar-General XXIII, vi) that in 12 counties (reckoning North and South Wales each as a county), more women than men can write: the difference being as much as from 5 to 8 in 100 marriages. In many counties however, there is a decided superiority on the male side: as in Lancashire, where 71 men and only 46 women sign; and as in the West Riding and South Wales, where there is a difference of 22 between the sexes.

One interesting question presents itself:—does juvenile mortality diminish, *ceteris paribus*, as the education of the mothers improves? It seems probable that such should be the case; and there are known facts which support the opinion. M. Le Play tells us that in one ill peopled part of Russia, a reward is offered to parents who bring up six children, and that the reward is seldom earned. He attributes the great juvenile mortality to ignorant

treatment, such as exposing to the cold the children attacked with measles. In the progress of Sweden as we learn from the excellent paper by Mr. Hendriks (*Statistical Journal*, xxv, 111) far the greatest diminution of mortality has taken place among the very young.

Some facts in my tables point in the same direction. Of 100 women who marry in all England, the marriage register is signed by 64; in London by 81: and this surplus of female education in London is accompanied by a singularly low death-rate of infants. In Surrey (extra metropolitan) the education is as good as in London, and the juvenile deaths are very few. In the other counties near London the same law holds good; since Berkshire, Kent, Essex, Hertfordshire, and Buckinghamshire, are all above the average in female education, and below it in the infantile death-rate. Bucks is the worst of them in both respects. Lancashire supplies decided confirmation; for that unfortunate county is disgracefully low in female education, and notorious for its high juvenile death-rate.

As usual, there is apparent evidence in the opposite direction. Both the East Riding and the North Riding are remarkable for the general extension of female education: whereas the East Riding has a high juvenile death-rate, and the North Riding a low one. But the force of the comparison is much weakened by finding, when we consult my column 4, that the East Riding has as many towns as Notts or the West Riding, and that in the North Riding the country predominates greatly. It is not pretended that the education of mothers will counteract all evil influences.

I should be glad if I had the means of doing for the towns what I have done for the counties, in comparing female education and infantile death-rates of different places. Unfortunately I do not find in the reports any table of signatures in towns. The smallest county has it: the largest town has it not. This want ought to be supplied.

I cannot suppose that if we had such an account, we should find a uniform combination of high female education and low infantile death-rate. A great demand for the labour of women, will everywhere cause a neglect of maternal duties; and no degree of education will correct this evil. The case of Coventry confirms this obvious truth. The registers completely support the statement that the distress of that town saved the lives of hundreds of infants, by keeping their mothers at home.

Recapitulation of A.

I have now gone all through the columns of my first table, and I have few more remarks to make upon it. I may say that it

strengthens the notion that the worst counties as to mortality whether of adults or of children, are those in which great towns prevail. Formerly perhaps, we might have said in which great *manufacturing* towns prevail: but we now know that the ill sanitary condition of Lancashire is owing more to its great seaport than even to its manufacturing towns. London too, was once thought to be pre-eminent in deaths. We see now that it is far surpassed by one whole county, and all but equalled by another, even taking the true test of male mortality: besides that to compare town with country is an unfairly severe trial for the town.

We learn also, that the sanitary improvements of the country have as yet made little impression on its rate of mortality; and that the diminished death-rates of certain parts have unfortunately, been all but balanced by augmented death-rates in other parts. We see too, that the apparent healthiness of some parishes, set apart for the especial residence of the affluent, is partly owing to the fact that many of the numerous female servants go elsewhere to die; and we conclude that the male death-rate is there the true standard of longevity. We find that some parts are more favourable to adults, some to young children: and what is more extraordinary, that some parts are more favourable to infants and some to children who have survived the first year.

I will explain hereafter the mode in which I have calculated the juvenile death-rate; the ordinary mode of calculation by a comparison of the number living with the number dying being impossible as regards the towns, without further data than those at my command.

II.

TABLE B.

My second table, containing about 30 of the principal towns, has been more difficult, and has cost me more labour, than my Table A, of counties. My difficulty has arisen from the fact that the Registrar-General has treated the towns too much as mere constituent elements of counties, instead of recognizing their substantive existence as aggregates of people placed under very different circumstances, and exhibiting very different sanitary laws, from those found among the rural districts. Though he has given the births, marriages, and deaths, of each parish, he has not given them for the towns, since these are often made up of several parishes and parts of parishes. Besides this, his epitome of results is generally confined to counties; a disregard of towns not so marked in the earlier years of the register (*see* Report IX); though even then the parish in some cases, or the district in other cases, was made to do duty as a town.

Now as I have already pointed out, Liverpool, Manchester, Birmingham, Leeds, and Sheffield, have each a greater population than 11 of the smaller English counties; and there are only 10 of the larger counties which exceed Liverpool. But this comparison is not the most important matter. In the towns, the mortality is greater, the marriages and births are more numerous, the average age of the people is lower, the wages are much higher, the occupations are more sedentary, the minds are more lively. Yet for these fifteen years no epitome has been given of the vast collection of figures relating to them.

More than this; the form of registration is such that it is impossible for anyone outside of Somerset House to get at the results. A few years ago, Mr. Commissioner Hill took some part in a controversy as to the sanitary condition of the borough of which he is recorder: he referred to these reports to ascertain the mortality: he confessed that he found himself baffled. Now in such matters many lawyers are easily baffled: but Mr. Hill, besides being an eminent lawyer, is familiarly acquainted with what we now call social science; and is moreover an arithmetician of unusual excellence. A register unintelligible to him must be quite inaccessible to the public. With reference to the same controversy, two other gentlemen searched the reports; and so entirely with the same result, that they were driven to ask the local registrars to supply the figures they wanted. Of these two inquirers, one was the able editor of a newspaper, the other was a professional accountant in large practice. If the registers are sealed books to such men, what must they be to people generally?

I now proceed to explain, as I did with Table A, each column of figures.

Columns 1 and 2.—My first two columns state the population of the various towns, first as given by the *census*, and then as given by the *Registrar-General*. In noticing the corresponding columns in the table of counties, I pointed out that the Registrar made some counties contain 5 or 10 per cent. more or less than they contain by the census; and that as a consequence, certain border parishes were transplanted into counties to which they did not belong topographically.

But these county irregularities are nothing compared with those now before us. Liverpool with a census-population of 444,000, is reduced by the Registrar to 270,000: Manchester is reduced from 339,000 to 244,000; Birmingham, from 296 to 213; Bristol, from 154 to 66 (less than half); Leeds, from 207 to 118; Sheffield, from 185 to 128; Hull, from 98 to 57.

Other towns are greatly exaggerated: as Bath, from a census-population of 53,000 to a register-population of 68,000: Blackburn

from 63 to 120 (nearly double) ; Bolton from 70 to 130 ; Bradford from 106 to 196 ; Macclesfield from 36 to 62 ; Oldham from 72 to 111 ; York from 40 to 60 ; Wolverhampton from 61 to 127 (more than double). Comparing Bristol and Bradford by the census, Bristol is the larger by one-half ; by the register Bradford is three times as large as Bristol.

Chester has no independent existence ; it is merely a portion of the district of Great Boughton. On turning to that unknown place, you find that it consists of four sub-districts, of which Chester Castle and Chester Cathedral are two : but by adding together the register-populations of these two, you find that they exceed by one-third that of the city of Chester, which I must therefore pronounce to be absent from the reports.

Leamington again, is wanting, and appears only as a sub-district of Warwick.

Inquirers may certainly demand that Chester and Leamington should appear in the index ; and it is highly desirable that all sub-districts should be indexed.

One great evil attends this disregard of the real boundaries of towns :—I mean the weakening of that influence which the register ought to exercise over the municipal authorities. The boundaries of the great provincial boroughs are neither antiquated nor unmeaning : they have been drawn rather recently, and include pretty nearly all those whom business or pleasure has brought together so as in the aggregate to constitute a town. According to the modern habits of the middle classes, few persons except artisans and medical men reside at their places of business : employers generally live in the suburbs and environs of towns. The old parish therefore, contains the poorest and least healthy portions of the population ; while the neighbouring parishes contain the more affluent and healthy. But the borough includes both these kinds of population ; and is therefore the true town, of which the death-rate ought to be studied and quoted. The register fails to give the means of doing this. If we desire to compare the mortality of Liverpool with that of London, we easily find the deaths of the parish of Liverpool ; but for the deaths of the 174,000 persons who constitute the remainder of the borough, we may search in vain. If we want to make such a comparison for Blackburn, Bolton, or Bradford, we find districts called by those names, but each containing nearly twice as many souls as the real towns.

As an illustration of the difficulty of disentangling the necessary figures, I will take the case of Birmingham ; a case which my local knowledge, aided by some familiarity with the first volume of the recent census, enables me to explain. The borough consists of the parish of Birmingham, the hamlets of Deritend and of Duddeston,

and the parish of Edgbaston, which latter has been shifted by the registrar into Worcestershire. I propose to calculate the death-rate for the 10 years, 1851-60. To do this, I have to learn first, the average population, and secondly, the average deaths. The first I learn from the census; the second I have to pick out from the register for each portion separately.

The average deaths are a tenth part of the aggregate deaths during the 10 years. These are given for the parish at XXIII, 232, as 51,238. But as Deritend, Duddeston, and Edgbaston, are only sub-districts, I must refer for them to p. 292. It is likely enough that an inquirer, not seeing these sub-districts following the parish, and having no instructions elsewhere, may set about, as I did, to collect the deaths from the register of each year. Instructions ought to be furnished, unless it is desired to seal up the registers from profane inquirers.

The 10 years' deaths in Deritend, Duddeston, and Edgbaston, are found to be respectively, 5,985, 7,190, and 2,070: and adding these to the 51,238 deaths in the parish, we have a total in the borough of 66,483 for the 10 years; and an average of 6,648 for each year.

The census (I, xxi) has supplied me with the population of the borough in 1851 and 1861, and from these figures I infer the average of the 10 years. But to prevent mistake, I compare with this the populations given by the register. Adding together the numbers assigned to the parish, the two hamlets, and the parish of Edgbaston, I find that the total is too large by 2,795. After revising my figures again and again, I comfort myself with pronouncing that a difference of 2,795 in 264,458 is not a formidable one.

Subsequently however, I find an explanation of the difference, but I find it in the census, not in the register. I discover (Census I, 476) that what the register calls Edgbaston, is not the parish but a sub-district with that name attached to it: that it contains the parish indeed, but that it also contains the considerable agricultural parish of Northfield. The population of Northfield is 2,795, the very excess that had perplexed me.

But a correction is now required; because the deaths recorded against Edgbaston, are really the deaths of Northfield as well as of the parish of Edgbaston. Making a proportionate reduction, I conclude that the death-rate of the borough is 25: and this is near enough to the truth, though it involves the assumption that the agricultural parish of Northfield, and the suburban parish of Edgbaston, are equally healthy.

But if in this instance, with my local knowledge, and by turning, with that for my guide, backwards and forwards to the register and the census, I arrive at last only at a near approximation to the

truth; any attempt to understand the mortality of other boroughs must be hopeless. I find, *e.g.*, by the census (I, 59), that the borough of Liverpool consists of the parish of Liverpool, part of the parish of Toxteth Park, part of the parish of West Derby, and the townships of Everton and Kirkdale. Turning to the register, I see nothing of Kirkdale, and I find the mortality for the whole of Toxteth Park, with no note of what part of it belongs to the borough.

I confess that as regards Blackburn, Bolton, and Bradford, where the population given by the register is nearly twice as great as that given by the census, I have not made an attempt to calculate the death-rate of the boroughs. But I must remark that the places set down under these names, instead of being towns, are districts each with a town for a centre. When therefore, we are led to believe that the death-rate of two of these places is 26, and of the other 27, we are greatly misled, because such a statement implies that it is the towns which are intended.

It is equally untrue that the death-rate of Liverpool is 33, that of Manchester $31\frac{1}{2}$, that of Birmingham $26\frac{1}{2}$: these are the death-rates of the worst parts of these boroughs; and the mistake is peculiarly great as to Liverpool, because the population given by the register is unusually below that of the census.

This is the most serious deficiency I have to point out. The town councils of boroughs are responsible to the country for the adoption of sanitary measures within their boundaries. The first information they need is the comparative death-rates of their own and of other boroughs. If they require their town clerk, or their inspector of health, to consult the reports, they learn as the result that boroughs are unknown to the Registrar-General: that in one case a parish, containing probably the greater part of the borough, in another case a district twice as large as the borough, stands under the name of the borough itself. Though I have shown how the death-rate of one borough may be culled from the figures given, I have before given proof that men of unusual competency, with their faculties whetted by controversy, have failed to discover the mode of doing this. The remedy I will suggest elsewhere.

Column 3.—In my next column I state the number of acres there are, not as in the counties to each person, but to every 100 persons. This does not conclusively determine whether or not the people are crowded; because many towns have extensive areas not built on; others have vast docks and blocks of warehouses; Liverpool and London have a considerable expanse of water included in their acreage; and the areas given for places like Blackburn, Bolton, and Bradford, are those of districts and prove nothing as to the towns. A large nominal area therefore, may co-exist with crowding:

but a confined area, like that of Liverpool, further narrowed by water and warehouses, does definitively prove over-crowding. It appears that the densest populations, judged by this imperfect standard, are those of the parish of Liverpool with three-fourths of an acre of land and water to every 100 persons; of the parish of Birmingham with $1\frac{1}{4}$ acres of land; of the parish of Leeds with $1\frac{3}{4}$ acres; of Nottingham and Plymouth with $2\frac{1}{2}$ acres; of London and of the parish of Bristol with $2\frac{3}{4}$ acres; of Brighton with 3 acres. This order is far from corresponding with that of the death-rates: for though Liverpool is at the top of both lists, Manchester, which is a particularly unhealthy place, has 5 acres to every 100 persons, an area four times as great as that of Birmingham, the healthiest of the great towns.

Column 4—gives the increase of population as furnished by the register: information of little value, because the partial limits fixed on reduce the high decennial increase of Liverpool to 4 per cent., and that of Manchester to 7 per cent.; while Bristol is represented as being about stationary.

Column 5—consists of the number of persons in a house. London is well known as having a high number: but this is not entirely owing to the crowding of families into a part of the large old houses, and to the absence of detached cottages; it is also partly caused by the great number of domestic servants in London, just as in Bath, Brighton, and Cheltenham. Plymouth has, of all these towns, the highest number in a house:—viz., more than 10; against $5\frac{1}{2}$ in all England, and against nearly 8 in London. Gateshead, Newcastle-on-Tyne, and Sunderland, have about the same as London, and the parish of Liverpool has not much less. The manufacturing towns generally, do not much exceed all England.

Columns 6 and 7.—We now come to the death-rates of the towns: and I have given first, those for the ten years 1841-50, and then those for the ten years 1851-60. Comparing these two decennial periods, I find some examples of marked improvement. This is notably the case with several of the largest and most unhealthy places. The parish of Liverpool improved from 39 to 33; but so much of the frightful 39 was owing to the famine-stricken Irish driven across the straits to die, to say nothing of exceptional cholera (as in the case of Hull), that I cannot pronounce what has been the real amendment caused by the closing of cellars and by other sanitary measures. Hull improved from 31 to 25; but the cholera-pestilence was chargeable with much of the excess of the former period.

Coventry improved by more than 2; Bath, Portsmouth, Leeds, and Bristol by nearly 2; Salford and Manchester by about $1\frac{1}{2}$; Leicester, Chester, and Plymouth by about $1\frac{1}{4}$; Macclesfield and Cheltenham by more than 1; London by less than 1.

Many places however, deteriorated: as Preston by fully 2 in the 1,000; Sheffield and Southampton by less than 2; Yarmouth and Gateshead by less than $1\frac{1}{2}$; Blackburn, Nottingham, and Norwich, by more than 1; Bradford and Brighton by less than 1.

I must notice here an inaccurate statement publicly made as to a supposed improvement connected with an outlay on drainage. A gentleman of authority in Bradford, in a paper ("Social Science Transactions, 1862," liv), correcting some unfortunate mistakes made three years before, stated that in Leeds, after the execution of the main sewerage, the death-rate fell from nearly 34 to 28. Now I find that the Leeds death-rate from 1841-50 was only $29\frac{1}{2}$ instead of 34; and that the reduction to 28 was a fall of less than 2 instead of a fall of 6.

Columns 8 and 9.—I now come to two columns, one containing the male death-rate, the other the excess of females living over males living. I have made some remarks on these topics, in my explanation of column 9 in Table A. I have noticed that in certain parishes containing an unusual number of affluent families, the proportion of the sexes is greatly disturbed by the aggregation of female servants; who are generally persons of favourable ages, and of more than average health; and who often return to their homes elsewhere to die. I mentioned several places, of which the most remarkable was Clifton; where at the last census the females of all ages exceeded the males of all ages by 73 per cent. I inferred that the male death-rate was more worthy of attention than the female. In my present Table B, I find that in all England the deaths in 10,000 males exceed the deaths in 10,000 males and females by 8: that in London the male excess is 19; in Clifton 36; in Leamington 31; in Southampton, Brighton, and Bristol 30; in Bath 27; in Edgbaston 24; in Yarmouth and Nottingham 23; in Manchester parish 22; in Liverpool parish 19; in Cheltenham and Leicester 18; in Bolton district and Leeds parish 17; in Birmingham parish and Coventry 15. It will be seen that it is not in manufacturing towns, but in resorts of the affluent, that the male death-rate is most in excess. Of manufacturing towns Nottingham is the highest, and Manchester is the next; both these, and only these, being above London.

It is not pretended that all the excess of females over males consists of domestic servants. Throughout the kingdom there is an average excess of 5 per cent. Then in places like Bath and Clifton, the number of ladies much exceeds that of gentlemen. Thirdly, it is only a part of the domestic servants who return to their native places to die. The excess therefore, of male over female deaths in certain parishes, is not so great as the excess of females living over males living.

Columns 10, 11, and 12.—The next matter I have to enter upon is

the death-rate of young children in towns. In explaining the corresponding columns of my table of counties, I mentioned that social reformers have indulged in exaggerations on the subject: going so far as to say that in many towns half the children born die before attaining their fifth year; and that more than a fourth die in their first year. I believe these errors have arisen from a false mode of calculating the death-rate.

I also deferred the explanation of my mode of calculation, and this I will now give. Two modes are possible. By the first, we ascertain the number of children living each year, and the number who die each year. A town that had 1,000 infants during the year exposed to the risk of death, and in which 150 infants died, would have an infantile death-rate of 150. This mode, to be accurate, would require an annual census. But we have to content ourselves with taking the mean of two decennial censuses.

For ordinary purposes this calculation is accurate enough, but it is not so for minute comparisons. It might happen that the year before the census, the deaths of infants were unusually numerous or unusually few; and in fact, the census of 1851 must have been sensibly affected by the low mortality of the year before, and by the consequently abnormal number of young children living. Again the rate of marriages fluctuates a good deal, according to the prosperous or adverse circumstances of the country: and if an unusually large number of marriages took place immediately after one census, say in 1852, and during a year or two afterwards, there would be an unusually large number of births during the first half of the decennial period; and if from 1855 to 1860 the marriages fell to their average rate, or below it, the young children living at the census of 1861, would be moderate: the augmented births of the first half of the decennial period appearing in the unusual number of children over 5 years old. The mean of the two censuses may therefore be far from accurately expressing the number of young children that have been exposed to the risk of death during the 10 years.

That these two causes, an irregularity in the death rate and an irregularity in the birth-rate, or that some other causes which have escaped me, do produce a sensible effect, is proved by the last census. In vol. ii, p. x, we find the numbers of the population at each age; and we see that of every 1,000 children under 5 years old, the number in the first year of life was 220; in the 2nd year 201; in the 3rd year 198; in the 4th year 191; in the 5th year 190: giving decrements of 19, 3, 7, and 1; decrements far indeed from those which would follow on the average from the ascertained laws of uniform births and deaths.

But since there is so much irregularity in the whole country,

where an excess in one corner is corrected by a default in another, we might safely assume that the various divisions would exhibit still less uniformity. I have not diligently sought for examples: but I find that in Bedfordshire in 1855, the deaths of infants were 463, in the next year, only 384; a difference of 79 or 17 per cent.: that in the same two years, the deaths of children over 1 and under 5 were 363 and 201 respectively; a difference of 162, or 44 per cent. How different would a census have looked as to the young children of Bedfordshire, if taken in 1855 or in 1856!

A similar instance, but in a town, is that of Nottingham; where the deaths of all under 5 were 584 in 1859, and only 372 the next year; a difference of 212, or 36 per cent.: and this irregularity, occurring just before the last census, would vitiate the enumeration as to that town. What happened in Nottingham, may have happened in a score of other towns and parishes.

It appears then that the authoritative mode of calculating the juvenile death-rates is far from perfect, in the absence of an annual census. This diminishes my regret that it is impossible to apply that mode to towns, without further data than we possess. The impossibility is caused by a want of harmony between the register and the census: the one giving the deaths in the *parishes*, the other giving the ages in the *boroughs*; and parishes being, in the absence of further information, incommensurable with boroughs. I know how many children there were in the borough of Liverpool at the last census: I do not know how many children died in the borough of Liverpool from 1851 to 1860.

It follows that another mode of calculation is necessary to ascertain the children's death-rate: this mode is to compare the deaths with the births. In places where the births and deaths were all accurately registered, and no migration went on, this mode would be perfect, and therefore preferable to the one founded on the census. As however, the registration is imperfect, and as young families are sometimes carried from one place to another, the results will be only an approximation to the truth, after every possible correction. This mode however, has one obvious advantage over the other, that it is not disturbed by the variations of births and deaths from year to year: it takes all the registered births and deaths during ten years, and it matters not whether these predominated in the beginning, the middle, or the end of the decennial period. Probably, for particular places, though not for the aggregate of the country, this birth-mode is more accurate than the decennial-census-mode.

At the head of columns 10 and 12, in the line for all England and Wales, I give the death-rate of male infants under 1, as $\frac{1.61}{1000}$: of male infants under 5 as $\frac{2.66}{1000}$. In the English life table (Registrar-General, XII, Appendix, 73) it is stated that of 513 male

infants under 1, 82 die the first year and 142 the first five years: making the death-rates respectively $\frac{160}{1000}$ and $\frac{277}{1000}$ against my $\frac{161}{1000}$ and $\frac{266}{1000}$; a difference of 1 in the one case and 11 in the other: the series of years however, not being the same in the two cases.

In the later reports, the epitome of results confounds all the first 5 years of life, a classification I regret. Besides this, the epitome is ambiguous, and to a casual observer quite unintelligible. If, *e.g.*, we turn to Report XX, xix, we find that in the 10 years 1847-56, the deaths of male children under 5 were $\frac{73}{1000}$. An inquirer, comparing this 73 with the 277 deduced from the Registrar's life table, is sorely perplexed. He supposes that the 73 is the average of 5 years of life, and that five times 73, or 365, represent the aggregate deaths; but 365 so much exceeds 277 that the conjecture is dismissed, and the volume is closed.

It is much to be regretted that the register should contain a table so hard to comprehend, and so liable to be misunderstood. I attribute partly to this ambiguous table, and to the reiterated statements of similar results in other parts of the reports, the gross exaggerations of sanitary reformers as to the deaths of young children. It was the duty of the Registrar-General, as I think, to explain the true import of this table, and to guard inquirers against the probable misinterpretation of it. But the language used in the register itself, confirmed the popular misapprehension, and even left it open to doubt, whether the Registrar-General himself did not share it. Thus, at XX, xx, under the head of "*Ages*," we see the words, "The mortality of males under 5 years of age was at the rate of 73 in 1,000:" which I believe would be generally interpreted to mean that out of 1,000 children born, 73 die in each of the first 5 years, or 365 in all the first 5 years. Again at the foot of the table itself, there is the remark, "Of 100 males living of the age of 35 and under 45," so many died: meaning that to 100 males *remaining alive* at the end of the year, so many died. The same equivocal notion in another form is to be found in an early report (IV, 17) where there are instructions how to calculate the death-rate; and where the number left alive is confounded with the number exposed to the risk of death. I trust that in future reports the Registrar-General will put inquirers on their guard against this ambiguity.

I have mentioned that in calculating the children's death-rates, a correction was required for the imperfection of the registers. Few bodies, even of the youngest infants, are buried without some public rites: registration follows of course. But many parents, through carelessness or procrastination, omit to register births. I conjectured formerly that this would happen especially in the case of illegitimate births; but two competent district registrars have

assured me that, on the contrary, mothers anxiously register putative fathers, under the fallacious notion that they thus secure evidence of paternity. It is certain however, that the register of births is imperfect: a fact proved by comparing the registers with the census; the excess of births over deaths, the emigration and the immigration, with the decennial augmentation of numbers. We can only conjecture what is the proportion of omissions: but as I am unwilling to understate the children's death-rate, and as the larger the number of births the lower must be the death-rate, I have assumed that the omissions are at the moderate rate of $\frac{1}{40}$. I have made a deduction therefore, of $\frac{1}{40}$ th, from all the figures in columns 10, 11, and 12, in Tables A and B, and of the corresponding columns in Table C.*

I may add that to save time, I took the births as well as the deaths of the 10 years 1851-60; though the infants that died in 1851 must, some of them, have been born in 1850; and though the children over 1 and under 5 must, all of them, have been born before 1851. In an increasing population, the births I have taken would be too numerous, and the death-rate therefore too low. I have consequently consulted my column that marks the rate of increase; and in each place for every 10 per cent. of increase, I have added to my juvenile death-rates, one-third per cent. in the case of infants, and 1 per cent. in the case of all children under 5. The death-rate of children over 1 and under 5 is found by subtracting one of these from the other:—column 10 from column 12.

After all the care I have taken, I know that my figures cannot be regarded as accurate; but I do hope they are sufficiently near the truth to indicate the *comparative* mortality of different places: and even if my juvenile death-rates should prove to be $2\frac{1}{2}$ or 5 per cent. too high or too low, such a divergence would not invalidate my principal inference that the juvenile death-rates have been grossly over-stated by sanitary reformers.

Column 10; results.—I will now mention some comparative results. As to male infants under 1, the highest death-rate is that of Liverpool parish:—240: against 161 of all England and of London. The next highest are Coventry 224; Nottingham 223; Manchester parish 220; Leicester and Preston 212; Norwich 208; Leeds parish and Oldham district 206; Blackburn district and Bradford district 205; Stockport district 204; Wolverhampton

* Since I read this paper, the third volume of the Census has appeared; we learn from it (p. 6) that the excess of unregistered births over unregistered deaths is about 5 per cent. of the births. My argument as to infantile deaths, is all the stronger. I have altered my tables in the appendix by deducting a second one-fortieth from the figures in columns 10, 11, 12, and by calculating column 13 afresh.

district 203; Yarmouth 202; Hull parish 201; Sheffield parish 196; Bolton district 194; Birmingham parish 189. The favourable cases are those of Portsmouth 147; Cheltenham and Chester district 156; London and Bath (as all England) 161; Derby 172; Brighton and Gateshead 174; Plymouth 175.

Columns 11 and 14.—Column 11 gives the death-rate of children over 1 and under 5. The most singular fact it reveals, is the large number of such deaths in London, when compared with the moderate mortality of infants: a fact I have already noticed. Whereas the London death-rate of infants under 1 is the same as that of all England, the London death-rate of children over 1 and under 5 is higher than that of all England by 30 per cent.: it is as 137 to 105.

Why should London infants be healthy, and London children past infancy be very unhealthy? Is it the impurity of the air? Surely that would injure infants more than others. It cannot be the want of domestic care, or of medical attendance; for if so, why should the infants escape? I conjecture that it is the want of space, and the consequent confinement of the children to the house or room in which they live: a circumstance not so injurious to infants, comparing them with infants of the same class in society elsewhere, because as they cannot run about, they are everywhere confined to the same room as their mothers.

If indeed, we satisfied ourselves with glancing at the density of the populations, as exhibited in my column 3, we should dismiss this opinion: since London appears there as having twice the space per head that Birmingham has; and three times the space that Liverpool has. But we know that Liverpool and Birmingham in the register, are the town parishes with all the suburbs cut off; while London includes Chelsea, Hampstead, Woolwich, and Sydenham. To make a fair comparison we must go to my Table C, of the different London districts; and then we shall see that Marylebone, the Strand, Whitechapel, the City, and other districts, are at least as much crowded as the parish of Liverpool. Besides this, the streets of these parts of London being narrow, are so filled with horse and foot passengers, that children are almost excluded from them.

Now of late years, nothing has been more clearly proved and more strongly brought into relief, than the necessity of open-air exercise, and the fatal effects of living under cover. Scavengers, we are told, are a healthy race: and the only explanation offered is, that the impurities they inhale are more than neutralized by the open air in which the men work.* The successful treatment of the insane,

* I am aware of the statement that the effluvia from animal ordure, even when fermenting, are generally innocuous.

takes out-door exercise as its basis. Mr. Neison, in his vital statistics, infers from his study of friendly societies, that the superiority of health in rural populations is not caused so much by greater purity of air as by labouring in the open air: since small shopkeepers and other sedentary persons in the country, have no great vital superiority over the same classes in towns; whereas the farm labourers who work out of doors attain, notwithstanding wet and rheumatism, much greater longevity than mechanics who work behind glass windows.

It is no wonder then, that London children, cooped up in part of a house, set maternal care and medical attention at defiance, and die by thousands. Persons who have lived in the great provincial towns, and have driven or ridden through the streets, are familiar with the annoyance caused by the swarms of children who turn the thoroughfares into playgrounds. Occasionally, a poor child is killed or maimed for life: but for one child thus cut off, a hundred probably, have their constitutions strengthened, and their lives saved from disease.

An inference too, may be drawn in favour of the practice of having a separate house for every family, as distinguished from model houses with a family occupying each story. The young children living on the flats above the ground floor, cannot be constantly running out of doors. Model houses, furnished with every other convenience, still lack the playground.

In some towns, the cheap houses are seldom built fronting the street: they are placed in yards and courts. These often look confined, sunless, and dismal; but they have this advantage, that they are safe playgrounds.

While I was writing this paper, there arose a painful discussion as to the sanitary condition of the children of Bethnal Green: and grave allegations were made as to diseases prevailing. As far as I know, no one thought of appealing to the Registrar-General about the juvenile death-rate: a proof I think, that the experience of a quarter of a century has failed to establish Somerset House as the ultimate authority in questions of mortality.

The last line of my Table C gives many particulars of Bethnal Green. We find that the population is dense, but not so dense as in many other parts of London: that the increase of population from 1851-61, and the number of persons in a house, were rather lower than those of all London: that the general death-rate from 1851-60 was considerably lower than that of all London; and that the male death-rate (the true test) was lower than that of all London. Bethnal Green appears to have very few female servants; for its whole excess of females over males is only $3\frac{1}{2}$ per cent., against 5 per cent. in all England and nearly 15 per cent. in all

London. But notwithstanding this, the number of persons in a house is large. Considering therefore the class who live there, and the considerable density of population, the death-rate is rather remarkably low.

The outcry however, was principally about the condition of the children. The leading fact was, that many of the children, failing other play places, ran among the pigstyes and contracted a loathsome skin disease. Consulting my columns 11, 12, and 13, of Table C, I find that the death-rate of infants under 1 year is singularly low; being 5 under that of all England and of all London; while that of Liverpool parish is higher by one-half (240 against 156). But under 1 year old, children cannot run among the pigs. When I come to the ages over 1 and under 5, the evidence of the figures confirms the medical testimony; for the death-rate, instead of being low as in the case of infants, is no less than $\frac{139}{1000}$, which is actually one-third higher than that of all England, though scarcely higher than that of all London, and less by a-third than that of Liverpool parish.

Healthy infancy, and sickly childhood: this combination surely, cannot mean impure air or maternal and medical negligence: it must mean want of space for the open-air sports of children. The great sanitary want of London, as it seems, is not better drainage, or burning of smoke, or better houses, so much as juvenile playgrounds within reach of every house. London does not want the *Crèche* of Paris, which in manufacturing towns, or in Liverpool, might save thousands of infants: it wants a Lisbon earthquake, or a Stuart fire, to give the opportunity of re-construction and extension. It does not want close infant schools, but children's open-air play-places.

But do these columns give similar results in other places? They certainly do in the case of the City of London. Its general death-rate judged by column 8, which includes a fair proportion of deaths in public institutions, is lower than that of all London: its infant death-rate is apparently low, though many infants may be sent elsewhere to die: its children's death-rate (over 1 and under 5) is higher even than that of Bethnal Green, besides the children that may die elsewhere; it is therefore, higher by more than a-third than that of all England. One comparison here is a striking one. In all England, more children by one-half die in the first year than in the four following years together: in the city, more children die in these four years together than in the first year. The column 2, of density of population, appears inconsistent with these results; for the area of the city is greater per head of population, than the area of Bethnal Green; in the proportion of 95 to 72. But besides the space taken up with public buildings, warehouses, and crowded streets, there is

a large deduction to be made for the area of the part of the Thames included within the city boundaries.

Going to other towns, we find that Liverpool parish even exceeds London in its *proportion* of children's mortality to infantile mortality, while its *absolute* juvenile death-rate is far higher. The deaths of infants (under 1 year) out of 1,000 births, are in London 161, in Liverpool 240, or one-half more: the deaths of children (over 1 and under 5) out of 1,000 births, are in London 137, in Liverpool 227, or considerably above one-half more. The proportion of children's deaths to infantile deaths, is in London 85 per cent., in Liverpool 95 per cent.; being for all England only 65 per cent. It may seem unfair to compare the parish of Liverpool, with the whole of London; but if the comparison is made with either the City of London or with Bethnal Green, matters are not much mended. Then comes the question whether this prodigious death-rate of children in Liverpool parish is accompanied by great crowding of the people. I answer that it is so. The area per head in the parish of Liverpool is about one-third of that of London: it appears better than that of Bethnal Green, but the water included in the case of Liverpool makes its land area less than that of Bethnal Green, by about one-fifth (*viz.* as 58 to 72).

Birmingham parish at first sight points the other way. The density of its population is high, as compared with that of other large towns; though it is less than half that of Liverpool, water being allowed for; nor is it anything near that of the London districts. It is undeniable also, that nearly every family has a separate house; and that the courts and streets furnish plenty of playground for the children. The death-rate of infants is higher than that of Bethnal Green by one-fifth; the death-rate of children (over 1 and under 5) is about the same as that of Bethnal Green: the Birmingham ratio therefore, is much lower, and neither contravenes the law, nor strongly supports it.

In Table B, column 14, I give for each town, the ratio of children's death-rate to infantile death-rate. After Liverpool come Plymouth and Portsmouth, each with a high ratio, though the density of the population is not great, even allowing for the water included in the area. Plymouth and Portsmouth therefore, do contravene the law. It is remarkable that both these are, like Liverpool, seaports.

If the law exists, the ample spaces for playgrounds in rural districts, ought to reduce the ratio far below that of towns. My Table A, of counties, is not one of rural districts only, but takes the counties including the town populations. The ratio in question therefore, ought to be lower than that of towns, but not so much lower as if the rural districts only were given.

I find then, that for every 100 infantile deaths, there are in the three worst counties 75 children's deaths: but thirteen towns have a ratio as high or higher; and instead of merely 75, Liverpool has 95, Plymouth and Portsmouth have 87, and London has 85. Again, three counties have a ratio as low as 44, while the best town on my list has 51. These facts are quite consistent with the supposed law.

Recapitulation of B.

I will now sum up the results of my remarks on Table B, of towns. Comparing the two decennial periods of 1841-50 and 1851-60, there has been a marked decrease in the death-rate of several towns: especially of Hull, which fell from 31 to 25; and of Liverpool, which fell from 39 to 33; making a decrease of 6 in each case. But in both these towns, the high mortality of the earlier period was exceptional; having been caused by frightful visitations of cholera, aggravated in Liverpool by the Irish famine and the consequent Irish immigration of dying persons. Manchester also, has a diminution of $1\frac{1}{2}$ in the 1,000, and London of less than 1: perhaps these two improvements may be permanent. In Birmingham the death-rate was a shade higher in the latter period; though a large sum had been spent in drainage, and many nuisances had been removed. As no cholera was ever known there, the comparison of the two periods is a more satisfactory one than that of London and of Manchester, and still more than that of Hull and of Liverpool. Bradford district was worse during the second period, notwithstanding great efforts at improvement. Some other towns exhibited a slight deterioration, many others a slight improvement.

On the whole it appears that the large outlay on drainage and purification, has done nothing like what it gave promise of twenty years ago. I am therefore, brought to think that causes other than an impure atmosphere, must be assigned for the painfully high death-rate found in great towns. In the case of the men, and partly of the women, one cause is the working under cover instead of in the open air: another doubtless, is the expenditure of high wages in coarse pleasures, unchecked by a knowledge of the laws of health. In many towns the undue employment of mothers causes the deaths of many infants: in all, but especially in London and Liverpool, the want of open-air amusements is answerable for the deaths of many children who had survived infancy. Unfortunately, these mischiefs are incapable of speedy correction. Ten years, and so many millions of outlay, would reform the whole drainage of the kingdom: but a generation will not do much to alter the habits of the nation; and a

century will not, as far as we know, banish glass windows from workshops, and turn cotton-spinning into the open air.

I have contended that for the purpose of comparison, the male mortality is the most important. The adoption of this, and of several other necessary corrections, would modify materially some of the Registrar-General's conclusions.

Of the very large towns, Birmingham stands next to London in *recorded* healthiness: the two having death-rates of 24 and $26\frac{1}{2}$ respectively. The necessary corrections, I believe, show that Birmingham is the healthier of the two. The difference in the male death-rates is 2·35; but this is for Birmingham parish, compared with the whole of London, including Hampstead and Sydenham. The difference in the male death-rates of London and the borough of Birmingham is less than 1 (·71). Again, London has a far larger proportion of affluent and educated persons than any manufacturing town has. Column 9 of B shows that London has probably three times as many domestic female servants, and therefore at any rate twice as many affluent families. Now by taking in the suburban parts of the borough of Birmingham the death-rate is reduced by more than $1\frac{1}{2}$: by doubling these affluent and educated parts, the death-rate would be reduced a second time by $1\frac{1}{2}$; at once turning the scale against London. Nor is this all. We ought to compare not only class with class, but also age with age. An infant asylum however healthy, will have twenty times as many deaths as a public school of equal numbers. A fast increasing town faintly resembles an infant asylum; London, which increases less fast, faintly resembles a public school. On this principle, according to my calculations of specific mortality eight years ago, a reduction of $\frac{1}{1000}$ should be made in the death-rate of Birmingham as compared with that of London.

The comparison will then stand thus:—

	London.	Birmingham.
Recorded mortality	24	$26\frac{1}{2}$
„ of males	25·70	28·05
„ in the borough	—	26·41
<i>Deduct—</i>		
1. On supposition that Birmingham had as many affluent families as London } 1·64	}	2·64
2. For excess of juvenile population 1·00		
	25·70	23·77

This account, if it be correct, shows that whereas according to the register, Birmingham has a death-rate higher than that of London by $2\frac{1}{2}$, it has really a lower death-rate by 2. An alleged

difference of $4\frac{1}{2}$ in the 1,000, say one-sixth of the whole, is startling enough, but I believe my statements to be correct.

As to juvenile mortality I need scarcely recapitulate what I have said. I have given my reasons for believing that there has been great exaggeration as to the deaths of children in towns; and I have attributed this error in part to the fallacious mode of stating the death-rate from those left alive instead of from all those exposed to the risk of death. I have also given the reasons for my conjecture that it is not impurity of town air so much as want of open air that multiplies the deaths of children.

III.

TABLE C.

There is a striking paper on the subject of mortality, in the "Social Science Transactions for 1860," pp. 632—648. It was written by Dr. Gairdner, an eminent Edinburgh physician; and he arrives at these startling conclusions:—First, that in unhealthy places, not only do infants die faster than in healthy places, just as adults do; but that unhealthy places are more fatal to infants than to adults; (*see* pp. 633—635 and 644): Secondly, that agricultural counties, and particularly the great corn-growing counties, are fatal to infants (pp. 640, 644): Thirdly, that the west-end of London has an unduly high death-rate of infants under 1 year (p. 648). My three tables will enable me I believe, to dispose very shortly of these three propositions.

I. The first is, that as a place increases in mortality, children suffer more than adults. Now the most unhealthy considerable place in England is Liverpool: its male death-rate is $\frac{35.23}{1000}$; something *more* than 50 per cent. worse than that of all England: its male infant death-rate is $\frac{24.6}{1000}$; something *less* than 50 per cent. worse than that of all England: in Liverpool therefore, infants suffer less, and not more, than adults. If the proposition had referred to children over 1 and under 5, Liverpool would, as far as it goes, have been on Dr. Gairdner's side.

But to fully investigate the question, I will refer to column 13 of my two first tables, A and B; and we shall there find the proportion between the male infant death-rate, and the male general death-rate, for every county and principal town: my figures, it will be found, contravene Dr. Gairdner's opinion. For in Table A, the highest proportion of infant death-rate is in Bedfordshire, Cambridge-shire, Lincolnshire, and Northamptonshire; and in none of these is the general death-rate high: in Table B far the highest proportion is in Coventry; then come Norwich, Oldham, and Leicester; but in all four places the general death-rate is decidedly under that of Liverpool, Manchester, Leeds, and Sheffield. I have selected these

cases ; but a further inspection of my columns will justify my disbelief in Dr. Gairdner's statement.

II. The second proposition is, that agricultural counties generally, and corn-growing counties especially, have a high infant death-rate : and this, not merely in comparison with the general death-rate of the same counties, but in comparison with the infant death-rate of other counties. The counties in which the agricultural population predominates over the town population, can be readily found by my column 4 of Table A : the most remarkable are North Wales, South Wales (each regarded as one county), Westmoreland, Essex, Herefordshire, Huntingdonshire, Rutlandshire. In these, with one exception, the infant death-rate is either low or very low. The exception is Huntingdonshire, which as we are told, has many persons engaged at home in manufactures, and which therefore, is not really agricultural, but resembles those counties in which towns prevail. Dorsetshire and Somersetshire, also, have a prevalence of agriculture and a low infant death-rate. I conclude that the second proposition, as far as agricultural counties are concerned, is unfounded.

As to the corn-growing counties the case is not so clear, though I have no means of determining exactly which counties come under this denomination. If Lincolnshire, Norfolk, Suffolk, and Cambridgeshire are fixed on, it is true that these except Suffolk have a high infant death-rate, as compared with that of the other agricultural counties I have mentioned. But then they are situated on the eastern side of the island, and have generally a marshy character. It is open to great doubt whether corn-growing has anything to answer for. The probability that climate is a predominating cause is strengthened by the fact, that a low infant death-rate prevails in the five south-western counties, Devon, Somerset, Wilts, Cornwall, and Dorset, to say nothing of the southern Hants. I conclude as to this second of Dr. Gairdner's propositions, that half is untrue and the other half unproved.

III. The third proposition is more startling than the other two : it is (pp. 646—648) that the west-end of London is fatal to infants ; fatal both absolutely in the number of deaths, and comparatively with the adult deaths in the same locality. My reply is that Dr. Gairdner's table and mine are quite at variance. We agree pretty nearly, considering that we take a different period, as to Hampstead and Lewisham ; but as to St. George's Hanover Square, Marylebone, and other districts, there is a difference of a-fourth or a-fifth ; a difference so considerable, that if it had occurred in all the districts, it would have led me to believe that this infant death-rate had been calculated from those left alive instead of from those exposed to the risk of death. Dr. Gairdner's special warning is founded on the

case of St. George's Hanover Square, a district that consists of "Hanover Square, May Fair, and Belgrave." Any close examination of the statement is unsatisfactory: partly because though written in 1860, it is founded on the mortality so far back as 1838-44, the latest period of any detailed calculations by the Registrar-General: partly because the general mortality of the district, fell in the last decennial period from 24 to 21: lastly, because the distribution of hospitals and workhouses over the metropolis, makes minute comparison impossible. All I can say is, that my figures, as they stand, make the male infant death-rate for St. George's Hanover Square, very low; for a town district singularly low; lower by 9 per cent. than that for all England; lower by nearly two-fifths than that of Liverpool; lower than that of any town in my list B except Portsmouth. If indeed, Dr. Gairdner had extended his inquiry to the case of children over 1 and under 5, he would have found that this west-end district has the fatal peculiarity I have discovered in the City and in Bethnal Green, though not in the same degree. It is not against infants, but against young children past infancy, that Hanover Square sins; but the evil is less than that of the other London districts I give, with the exception of Lewisham and Hampstead, which belong to the country rather than the town.

But if the case were worse than it is as regards children past infancy, the inference would be quite different from that to be drawn from a high infant death-rate. In this latter case one might attribute the mischief to the custom of employing wet nurses, and generally to maternal neglect; but as to children past infancy, it seems more probable that the want is rather of gardens and playgrounds in which the children might live out of doors as they would in the country; a want only partially relieved by a morning and afternoon run in the parks.

I have mentioned the complication caused in the London districts by the irregular distribution of workhouses and hospitals. West London is an extreme case. The general death-rate appears to be $\frac{45}{1000}$: it is really only 24, as appears from column 8. The explanation is that it has St. Bartholomew's Hospital within its boundaries, and that the deaths there, added to those in the workhouse, are more than half the deaths of the district. I do not mention this obvious correction as any new discovery. The register furnishes the number of deaths in these institutions; I wish it also distinguished the sexes and ages; as for want of this classification I have been unable to correct my Table C so as to make it of much value.

As regards Dr. Gairdner's statements therefore, I conclude that they are unfounded. It turns out that, if my tables are correct, unhealthy places are not more fatal to infants than to adults: that

the infant death-rate is not high in agricultural counties: that it is not high at the west-end of London. It does seem that that rate is high in some corn-growing counties, but it seems as probable that this is caused by damp and bleak situation as that it is caused by maternal neglect.

Changes Wanted in the Register.

In the course of my remarks, I have pointed out what seem to me defects in the Registrar-General's reports, as well as certain additions which I regard as desirable. I will briefly recapitulate these.

First, the register should be so complete in itself, as to enable any competent person to calculate the death-rates for any parish, town, or borough, and for either sex, without referring to the census. It should also be so arranged as to give every possible facility to casual inquirers; and for this end there should be prefixed notices and instructions, with examples. The form of the register is generally excellent; but it would be advantageous if in all parts a space were left after every five lines of figures. The table given several times, and for example, at XX, xix, requires explanation; readers should be told what it does and what it does not indicate. The first year of life too, should be given separately.

Most of the other changes have reference to towns; but in the counties there is one much wanted: I mean where a border place is carried out of its own county: notice of such an irregularity should be given at the head of each county; the preliminary instructions should mention that such changes in topography occur: and the general index should be extended to sub-districts.

I have shown that the information about towns is very defective: that in the greatest towns the parish stands for the borough, although it may contain less than half the population, as in Bristol; and although such a statement may much exaggerate the death-rate, as in Liverpool from 1841-50. The remedy is not obvious. It is undesirable to increase the difficulties of reference and comparison by disturbing the present form and uniform paging of the register. Probably the best way would be to add to the decennial volume which follows the census, full particulars of every *borough*, with numbers of births, marriages, and deaths, and the rates per 1,000 of each of these.

The index wants large additions. Many towns, Chester and Leamington, *e.g.*, do not appear in it, because they happen not to be separate districts. Every sub-district should be given.

There is another signal deficiency. The report supplies us each

year with the proportion of men and of women who sign the marriage register; but this is given only for each county and for London. This important information as to the state of education in the towns is entirely withheld from us.

In the London register notice is given in each district of the number of persons that die in hospital, workhouse, &c. In "West London" half the deaths are thus accounted for. The same should be done for other towns, that each sub-district may be judged of fairly. Notice should also be given of every case in which any public institution is situated outside a borough; and the number of extruded deaths should be stated, with sex and age.

In London, this notice, H, W, &c., should be repeated in every page where the number of deaths is given. And what is of greater importance, the sexes and ages should be given at pp. 83, 84.

Decennial Volume.

But of all improvements the greatest would be the compilation of a good epitome of results once in 10 years, after the census has been taken.* The present epitome is feeble and lame. An elaborate series of tables was given in 1846, of results for the years 1838-44; *i.e.* for seven years taking the census year 1841 as the pivot. Since that time the Registrar-General's statistical zeal has cooled, and the calculation of results has been left to the irregular efforts of individuals, who are quite unable to accomplish it fully. After the lapse of 18 years it is time that a new official effort should be made.

No doubt, in the decennial epitome, as for example in Vol. XXIII, there is a summary of the registers of the 10 years, but it is a mere summary, unaccompanied with any results. We have the marriages for each of the 10 years, and for all together: we have the population for 1851 and for 1861; from these data any competent person may calculate the marriage-rate. But in my opinion the rate should be added; for each county, each borough or town, each district and sub-district. This column of percentages would be useful for reference by the authorities of any place: it would be highly useful for inquirers who desire to compare place with place, and who find that to make the calculations themselves would require the devotion of their life to this one pursuit. Who has time and patience to calculate the marriage-rates in 21 pages of 50 or 60 lines in each? The same question may be asked as to the births: and as to the deaths, these occupy 100 pages of districts and sub-districts. I ask therefore, that the decennial volume should have the *rates* of births, marriages, and deaths, added to the *absolute numbers*.

I do not ask for an annual column of percentages: for as I have

* I am glad to hear that such a volume is being prepared.

shown in the case of Bradford,* no enumeration is to be relied on but the census; and the assumption of an uniform rate of increase will often prove untrue.

It is especially to be desired that the decennial volume should give the rates for boroughs: not, as in the annual returns, setting down a parish for a borough in one case, and a district for a borough in another.

These rates too should be given in each decennial volume, for 1841-50, for 1851-60, and hereafter for 1861-70: and this for counties, boroughs, and other divisions. An estimate of progress or retrogression would then be easy.

The decennial columns of population should distinguish males and females. At present we have the male deaths and the female deaths; but we can get the male population and the female population only by going to the census.

Then we want a summary for the 10 years of the deaths at different ages. At present, to ascertain the decennial deaths of young children for any county or town, we have to refer to ten reports, extract the figures and add them together. The summary should be accompanied with a percentage column, calculated in either of the two modes I have pointed out. If the census mode is adopted, the calculation should be made from all exposed to the risk of death, and not from those remaining alive. If the birth mode is adopted, the needful corrections should be made, and the principle of the correction should be stated. To me it would be more satisfactory if there were two columns, one for each mode. In this case, the number of births, and the population at each age and for two censuses, should be stated.

The sub-districts should be treated in the same way. Since places like Leamington and Chester are ranked as sub-districts, these minor divisions ought, once in 10 years, to have an opportunity of knowing their condition: and indeed every town or parish however small, is entitled to the same information.

The life tables at present, are for ordinary persons almost inaccessible, with no note to mark the volume and page in which they are buried. The male table is in one place, the female in another. The decennial volume should contain a life table, of males and females, whether a new one or a repetition of the old one. Every annual report should state where the life table is to be found.

A summary of the 10 years' deaths in hospitals and other public

* The Bradford statement was suspected by a disinterested authority. Mr. Winder, Assistant Commissioner, said in 1859, that the Bradford population was estimated by the municipal authorities at 130,000; but that after looking at the calculations, if the authority had not been so high, he should have been inclined to suspect that the estimate was too liberal. (Education Commission 2, 179.)

institutions should be given. The sexes and ages should be distinguished. This should be done for the country generally, and not for London only.

These are the principal additions which have occurred to me as desirable in the decennial report. But many others might probably be found by consulting other students of the registers.

Instructions Wanted.

On first opening one of the reports, the reader is bewildered with the multitude of particulars: he wants a guide to point out his way. A stereotyped preface should be given to each volume, and especially to the decennial volume. The rules for calculation should have examples added.

The following is some of the instruction required. "England" means "England and Wales." The Registrar-General has adopted the districts of the Poor-Law Board, and therefore does not strictly observe the geographical boundaries of counties. For example, Berkshire takes from its neighbours, 30,000 persons. Border places therefore, will often be found in adjoining counties. The index does not contain sub-districts.

The register takes no notice of boroughs, because *the poor-law* has no concern with them: Liverpool and other great towns are represented by parishes of the same names: Bradford and similar towns are concealed in districts of the same names. An ingenious and patient accountant may extract approximate statistics of the boroughs, with the help of the census. An example may be found in the *Statistical Journal* of June, 1864, pp. 188, 189.

Sub-districts.—Some places of considerable importance are ranked as sub-districts, *e.g.*, Leamington is part of the district of Warwick: Chester is merged in Great Boughton, and appears partly as Chester Castle, partly as Chester Cathedral, two minor divisions which do *not* together agree in numbers with those of Chester.

Calculations of rates.—The death-rates in the register, at XX, xix, for example, are calculated by a comparison of deaths with persons left alive: *e.g.*:—if the whole deaths of a particular year are set down as 22, this means that 22 have died to every 1,000 persons left alive. But the number exposed to the risk of death was

$$1,000 + 22 = 1,022; \text{ and the true death-rate was } \frac{22 \times 1,000}{1,022} = 21.53.*$$

In juvenile deaths the irregularity is much greater: *e.g.*:—if 360 children die in the first five years, this means that 360 have died to every 1,000 left alive. But the number exposed to the risk of death was $1,000 + 360 = 1,360$; and the true death-rate was

* This, I believe, is strictly true, only on the supposition of a stationary condition of population and of uniform ages.

$\frac{360 \times 1,000}{1,360} = 265$. That is, out of 1,000 children born, the number who die in the first 5 years is 265, not 360. This ought to be explained in the Register.

The life tables are not given in each volume, nor in the decennial volume: nor is the female table given with the male. There is one life table at IV, 23: another of males at XII, 73, and one of females at XX, 177.

Calculations of percentages require experience and care. The returns of one or two years, and an estimated population for any particular place, may lead to grave errors, as will be seen in the case of Bradford, given in the "Social Science Transactions for 1862," introduction, lii. The returns for the 10 years between one census and another are the only safe data, as the average population for such periods is known. Summaries of the returns for the 10 years are partly furnished: other summaries must be obtained by consulting the separate volumes for each year. For 1851 to 1861 the summaries given will be found in Vol. XXIII, pp. 174—327:—viz., the summary of marriages at districts at p. 174; of births in districts at p. 196; of births in sub-districts at p. 240; of deaths in districts at p. 218; of deaths in sub-districts at p. 240. No summary is given of marriages in sub-districts. This can be obtained by consulting the volumes for each year: and the same is true of the deaths at different ages.

The population of each place for 1851 and 1861, according to the conventional boundaries assigned by the Poor-Law Board, will be found in the summary at XXIII, 174, &c.; the acreage at p. 2, &c.; the male and female population are not given separately, but will be found in the census.

In making calculations as to the London districts, the hospitals and other public institutions must be taken into account. They are irregularly distributed; the City, *e.g.*, having none. All the districts that have such institutions are marked H, W, &c., in the 10 years' summary, but not in the annual reports. Each annual report contains, at pp. 83, 84, the number of deaths in these institutions during the year: but no 10 years' summary is given. Outside of London, no such institutions are marked in the districts; the sub-districts however, have the workhouses marked, but no other institutions.

No extensive calculations of percentages are added to any of the late reports; but some important ones deduced from the early reports, will be found in Vol. IX.

Forms of Calculation.

To find the death-rate of any place.—Add together the population of 1851 and 1861 (not according to the census, but according to

Registrar-General, XXIII, 218, &c.): half the total is the average population. Find the 10 years' deaths (Registrar-General, XXIII, 218, &c., for districts, 240, &c., for sub-districts): multiply by 100 and divide by the average population.

Example.—Bedfordshire, p. 218.

$$\text{Average population, } \frac{129,805 + 140,479}{2} = 135,142$$

Number of deaths 28,170.

$$\text{Death-rate during the 10 years, } \frac{28,170 \times 100}{135,142} = 20.85.*$$

To find the male death-rate.—Refer to the Census I, 194, &c., for population of 1851 and 1861: half the total of the two will be the average. The summary of male deaths in districts is given by the Registrar-General, XXIII, 218: no summary in sub-districts is given, but it can be collected from the separate volumes. Multiply the 10 years' deaths by 100, and divide by the average population.

To find the juvenile death-rate of any place.—The number living at any age must be found in the census. In boroughs the numbers are given for the whole borough: and as the Registrar-General knows nothing of boroughs as such, any calculation for boroughs by this mode is impossible. For places which are not boroughs one caution is necessary. To ascertain how many children die out of 1,000 who are born, the calculation must be made by a comparison of all who die and all who have been exposed to the risk of death. *E.g.*: if the census gives 1,000 as the number of children under 5, living in a certain place; and if the annual deaths under 5 have been 350, the number who have been exposed to the risk of death is

$$1,000 + 350 = 1,350. \text{ The death-rate will be } \frac{350 \times 1,000}{1,350} = 259.$$

Another mode is to compare the *births* with the *deaths*; making an allowance of 5 per cent. for excess of unregistered births over unregistered deaths. The deaths will be found in each report p. 98, &c.: the births for the 10 years are summarised in XXIII, 196, &c., and 240, &c.

Example.—If a place has annually 1,350 registered births, and 350 registered deaths annually under 5 years, the death-rate will be $\frac{350 \times 1,000}{1,350} = 259$, subject to a deduction of 5 per cent. for excess of unregistered births over unregistered deaths.

These are the instructions which have occurred to me as examples. Others should be added as to marriages and births. By consulting different inquirers the list might be made complete.

* My Table A gives 20.78 and is taken from Registrar-General, XXIII, xiv. I explained before that the Registrar's averages are slightly altered by taking the intercalated years into his account.

I have now finished the task I have undertaken, of first, explaining my three tables, column by column; and then briefly collecting my practical inferences under a few heads.

NOTE.—While was I revising the proof of this article, I became acquainted with a House of Commons Return, “Deaths,” ordered 24th July, 1863. This paper has enabled me to test the accuracy of some of the figures in my appendix, as to which I have expressed fears that errors would be found among them. My column 7 of Table B, and my column 6 of Table C, contain a set of figures, which appear in the Parliamentary Return. I am glad to find that I am acquitted of any error of even slight importance.

The column, “At less than 1 year of age—All Causes,”—throws light on the most difficult question in my paper. The total infantile deaths, male and female, are set down as $\frac{177}{1000}$. This means that there were 177 deaths in proportion 1,000 infants *left alive*: I contend that it would be far more perspicuous to say that there were 177 deaths out of 1,177 infants exposed to the risk of death; and that therefore the true infantile death-rate was $\frac{150}{1000}$.

My infantile death-rate, at A, column 10, line 1, is 161; but this is for *boys* only: for boys and girls my rate would be 147, *i.e.*, 3 less than the 150 in the Parliamentary paper.

Considering that my calculation is made from births, while the other is made from the enumeration of two censuses, the difference of $\frac{3}{150}$, or 2 per cent., seems very small. This confirms me in my opinion that my proposed amendment, though not theoretically true, leads to a correct result in the present condition of the register.

APPENDIX.

TABLE A.—Vital Statistics of each County in England

1	2	Registration—Counties, &c.	3	4	5	6	7
Population, in Thousands, 1861, by the Census.	Population, in Thousands, 1861, by the Registrar-General.		Number of Acres to each Person.	Rural Population in Proportion to Town Population.	Increase of Population per Cent. in 10 Years by Census.	Number of Persons in a House.	Death-rate, 1841-50, to 1,000 of Population, Registrar-General, 13, 194.
20,066	20,066	England and Wales	1·86	—	11·93	5·37	22·28
112	2,804	London	·0279	—	18·70	7·8	24·55
135	140	Bedfordshire	2·18	2·10	9·	4·93	21·65
176	206	Berkshire	2·56	1·57	4·	4·93	20·11
168	147	Buckinghamshire	2·78	1·56	3·	4·81	21·43
176	182	Cambridgeshire	2·98	2·18	} minus 5·	} 4·68	22·54
505	470	Cheshire	1·39	·76			23·14
369	365	Cornwall	2·37	2·68			18·97
205	205	Cumberland	4·87	1·30			21·10
339	294	Derby	1·94	2·21			21·24
584	589	Devonshire	2·83	1·11	3·	5·76	19·69
189	182	Dorsetshire	3·35	2·03	2·	5·01	19·56
509	542	Durham	1·22	1·07	30·	6·	22·41
405	380	Essex	2·62	3·48	10·	4·98	20·19
486	444	Gloucestershire	1·66	·83	6·	5·23	21·96
482	457	Hants	2·22	1·09	19·	5·57	20·23
124	108	Herefordshire	4·32	3·38	7·	4·89	20·82
173	177	Herts	2·25	2·89	4·	4·97	20·18
64	59	Huntingdonshire	3·57	3·34	·1	4·69	21·85
—	545	Kent (<i>extra metropolitan</i>)	1·4	·78	19·	5·81	20·58
2,429	2,465	Lancashire	·5	·44	20·	5·54	27·52
237	244	Leicestershire	2·16	1·37	3·	4·58	21·69
412	404	Lincolnshire	4·31	2·23	1·	4·76	19·65
—	187	{ Middlesex (<i>extra metro-politan</i>)	·08	·19	17·	7·90	19·44
175	197		2·11	2·32	11·	5·28	22·64
435	427	Norfolk	3·12	2·34	} minus 2·	} 4·50	20·97
228	231	Northamptonshire	2·77	2·38			21·51
343	343	Northumberland	3·64	·90			21·72
294	324	Nottinghamshire	1·79	·93			20·83
171	171	Oxon	2·77	1·79			21·38

APPENDIX.

and Wales in the Two Decades, 1841-50 and 1851-60.

8	9	10	11	12	13	14	15	16
Death-rate 1851-60, Registrar- General, 23, xiv.	Male Death-rate, 1851-60, Registrar- General, 23, 218, and Census, 194.	Male Death-rate under 1 Year to 1,000 Births, Registrar- General, 14 to 23, and 23, 196.	Male Death-rate from 1 to under 5 Years. (Total of 4 Years.)	Male Death-rate from Birth to under 5 Years. (Total of 5 Years.)	Proportion of Male Death-rate under 1 to General Male Death-rate.	Number of Male Deaths in the 4 Years, over 1 and under 5, in Proportion to 100 Male Deaths under 1.	Rate of Farm Wages, 1860, <i>Statistical Journal</i> , xxiv, 328.	Number of Women per Cent. who sign Names to Marriage Registers, Registrar- General, xxiii, vi.
22·24	23·05	161	105	266	7·00	65	s. d. —	63·8
23·77	25·70	161	137	298	6·26	85	—	81·4
20·78	21·30	172	85	257	8·08	49	10 3	54·8
20·24	20·53	135	78	213	6·57	58	10 8	75·8
20·82	20·65	154	77	231	7·45	50	No return	65·0
20·55	21·33	172	86	258	8·06	50	10 —	65·5
22·49	23·28	170	101	271	7·30	60	11 8	54·9
20·44	21·43	139	89	228	6·49	64	10 6	56·9
20·84	21·45	139	87	226	6·48	63	15 —	66·4
21·71	21·69	156	88	244	7·19	56	12 —	64·5
19·77	20·74	130	95	225	6·27	73	9 2	72·6
19·35	19·71	132	79	211	6·69	60	9 4	71·0
23·30	23·29	164	111	275	7·04	68	14 3	57·8
20·18	20·44	145	84	229	7·09	58	11 3	69·1
21·11	22·13	149	94	243	6·73	64	9 5	73·2
20·26	21·01	130	93	223	6·19	71	12 —	76·1
20·28	20·67	137	67	204	6·63	49	9 —	71·1
18·93	19·43	139	73	212	7·15	52	10 —	66·6
19·69	20·56	164	74	238	7·98	54	10 9	67·9
20·11	20·75	141	88	229	6·79	62	12 —	75·9
26·30	27·44	192	144	336	6·99	75	12 7	45·9
21·86	22·43	175	93	268	7·80	53	13 6	66·3
19·47	19·75	159	70	229	8·05	44	13 —	72·3
20·67	21·76	141	92	233	6·48	65	No return	80·1
22·58	23·36	151	113	264	6·46	75	11 8	48·9
21·20	21·94	174	76	250	7·93	44	10 7	70·0
21·26	20·99	169	81	250	8·05	48	11 —	69·2
22·09	22·71	148	104	252	6·52	70	14 —	69·4
22·49	22·81	180	95	275	7·89	52	12 9	61·4
20·65	20·97	145	80	225	6·91	55	No return	71·7

TABLE A.—Vital Statistics of each County in England

1	2		3	4	5	6	7
Population, in Thousands, 1861, by the Census.	Population, in Thousands, 1861, by the Registrar- General.	Registration—Counties, &c.	Number of Acres to each Person.	Rural Population in Proportion to Town Population.	Increase of Population per Cent. in 10 Years by Census.	Number of Persons in a House.	Death-rate, 1841-50, to 1,000 of Population, Registrar- General, 13, 194.
22	23	Rutlandshire	4'36	3'26 {	minus 5' }	4'71	19'34
241	260	Salop	3'43	1'61	5'	4'98	20'86
445	463	Somersetshire	2'35	2'62	2	5'09	20'28
747	770	Staffordshire	97	72	23'	5'08	23'86
337	335	Suffolk	2'81	2'33 {	minus 04'	4'62	19'93
—	273 {	Surrey (<i>extra metropo- litan</i>)	58	48	22'	6'38	18'07
364	367	Sussex	2'58	79	8'	5'55	18'29
562	561	Warwickshire	1'	43	18'	4'83	23'25
61	61	Westmoreland	7'98	4'06	4'	5'16	19'31
249	236	Wiltshire	3'47	1'09 {	minus 2'	4'70	20'69
307	295	Worcestershire	1'54	98	11'	4'87	20'95
240	} 275 {	Yorkshire, East Riding	3'19	} 91 {	9'	4'89	} 23'54
40		„ City	07		11'	4'90	
245		„ North Riding	5'5		14'	4'88	
1,508		„ West „	1'13		93	14'	
427	416	North Wales	4'70	8'11	3'	4'69	19'54
685	700	South „	4'	4'52	6'5	5'07	20'48

Note.—Columns 3—6 are

TABLE B.—Vital Statistics of some of the Principal Cities and

1	2		3	4	5	6
Population, in Thousands, 1861, Municipal, by the Census, I, xxi.	Population, in Thousands, 1861, by the Registrar-General, 23, 222, &c.	Districts, Towns, &c.	Number of Acres to 100 Persons according to Registrar-General, 23, 6, &c.	Increase of Population per Cent. in 10 Years, Registrar-General, 23, 196.	Number of Persons in a House by the Census.	Death-rate, Male and Female, 1841-50, to 1,000 of Population, Registrar-General, 13, 194.
20,066	20,066	England and Wales.....	186	11·93	5·37	22·28
112	2,804	London	2·79	18·7	7·80	24·55
53	68	Bath	44·37	{ minus 2·16 }	6·55	24·02
—	213	Birmingham parish	1·25	22·23	5·01	26·16
296	—	„ borough	—	—	—	—
13	16	Edgbaston	—	—	—	—
—	—	„ parish	—	—	—	—

and Wales in the Two Decades, 1841-50 and 1851-60—Contd.

8	9	10	11	12	13	14	15	16
Death-rate, 1851-60, Registrar-General, 23, xiv.	Male Death-rate 1851-60, Registrar-General, 23, 218, and Census, 194.	Male Death-rate under 1 Year to 1,000 Births, Registrar-General, 14 to 23, and 23, 196.	Male Death-rate from 1 to under 5 Years (Total of 4 Years.)	Male Death-rate from Birth to under 5 Years. (Total of 5 Years.)	Proportion of Male Death-rate under 1 to General Male Death-rate.	Number of Male Deaths in the 4 Years, over 1 and under 5, in Proportion to 100 Male Deaths under 1.	Rate of Farm Wages, 1860, <i>Statistical Journal</i> , xxiv, 328.	Number of Women per Cent. who sign Names to Marriage Registers, Registrar-General, xxiii, vi.
18·	17·87	126	56	182	7·05	44	<i>s. d.</i> No return	78·8
20·10	20·49	142	77	219	6·93	54	10 —	59·9
19·78	20·52	135	77	212	6·58	57	10 —	69·4
24·85	25·31	182	126	308	7·19	69	12 6	48·3
20·23	20·43	147	69	216	7·19	47	10 7	69·7
18·02	18·19	126	84	210	6·93	67	12 9	82·0
18·95	19·69	130	79	209	6·60	61	11 8	81·6
23·28	24·06	176	113	289	7·31	64	10 9	64·0
18·31	18·55	104	64	168	5·61	61	14 3	77·7
20·66	20·79	135	80	215	6·49	60	9 6	69·8
20·36	21·02	157	88	245	7·47	56	10 —	63·6
22·18	23·04	181	91	272	7·86	50	13 6	71·1
19·47	19·56	136	66	202	6·95	49	13 6	74·3
23·89	24·55	177	111	287	7·21	63	13 6	53·4
20·18	20·44	131	80	211	6·41	61	} 11 2 {	46·1
21·69	22·48	137	103	240	6·09	75		42·1

taken from the Census.

Towns of England in the Two Decades, 1841-50 and 1851-60.

7	8	9	10	11	12	13	14
Death-rate, Male and Female, 1851-60, to 1,000 of Population, Registrar-General, 23, 230.	Male Death-rate, 1851-60, to 1,000 of Population, Registrar-General, 23, 218, and Census, 194.	Excess of Females over Males per Cent., 1861, Census, 192.	Male Death-rate under 1 Year to 1,000 Births, Registrar-General, xiv to xxiii, and xxiii, 196.	Male Death-rate over 1 and under 5 Years (Total of Four Years.)	Male Death-rate from Birth to under 5 Years. (Five Years.)	Proportion of Male Death-rate under 1 to General Male Death-rate.	Number of Male Deaths in the 4 Years over 1 and under 5, in Proportion to 100 Male Deaths under 1.
22·24	23·05	5·25	161	105	266	7·00	65
23·77	25·70	14·48	161	137	298	6·26	85
22·03	24·78	53·30	161	95	255	6·50	59
26·51	28·05	4·65	189	140	329	6·74	74
25·20	26·41	5·61	—	—	—	—	—
14·90	17·33	44·5	—	—	—	—	—
—	—	57·20	—	—	—	—	—

TABLE B.—*Vital Statistics of some of the Principal Cities and*

1	2		3	4	5	6
Population, in Thousands, 1861, Municipal, by the Census, I, xxi.	Population in Thousands 1861, by the Registrar-General, 23, 222, &c.	Districts, Towns, &c.	Number of Acres to 100 Persons, according to Registrar-General, 23, 6, &c.	Increase of Population per Cent. in 10 Years, Registrar-General, 23, 196.	Number of Persons in a House by the Census.	Death-rate, Male and Female, 1841-50, to 1,000 of Population, Registrar-General, 13, 191.
63	120	Blackburn district	36·32	32·18	5·58	25·18
70	130	Bolton „	33·69	13·56	5·36	26·79
106	196	Bradford „	20·53	7·97	4·72	24·88
78	78	Brighton	2·99	18·49	6·24	21·36
—	66	Bristol parish	2·79	·47	6·53	28·60
154	—	„ borough	—	—	—	—
—	95	Clifton	—	—	—	—
40	50	Cheltenham district	49·96	12·61	5·66	20·12
31	59	Chester „	183·85	10·49	5·21	23·49
41	42	Coventry	13·18	13·14	4·55	26·85
43	51	Derby	5·82	16·86	4·80	23·98
34	59	Gateshead	43·07	23·56	7·65	24·53
98	57	Hull	3·21	12·26	5·00	30·63
18	19	Leamington	15·45	11·81	5·51	19·19
207	118	Leeds	1·79	16·11	4·64	29·56
68	68	Leicester	5·81	12·44	4·66	26·75
444	270	Liverpool parish*	·82	4·07	7·28	39·22
—	—	„ and West Derby	—	—	6·75	34·95
36	62	Macclesfield	132·54	{ minus 2·82 }	4·33	25·96
339	244	Manchester	5·18	6·81	5·69	33·08
—	—	„ and Chorlton	—	—	5·51	30·69
102	105	Salford	4·58	20·35	5·36	27·65
109	111	Newcastle-on-Tyne	6·40	24·46	7·80	26·83
75	74	Norwich	5·81	9·16	4·38	23·90
75	76	Nottingham	2·47	29·69	4·84	25·51
72	111	Oldham	15·16	28·22	5·24	25·80
63	63	Plymouth	2·61	19·87	10·29	24·82
95	95	Portsmouth	8·23	31·47	6·00	24·72
83	111	Preston	61·56	14·48	5·51	25·12
185	128	Sheffield	8·21	24·44	4·87	26·65
47	43	Southampton	6·06	27·32	6·00	22·82
55	94	Stockport	32·55	4·6	4·86	25·28
78	91	Sunderland	13·17	28·52	7·80	24·33
61	127	Wolverhampton	42·47	21·83	5·17	27·24
35	30	Yarmouth	4·98	12·87	4·47	23·33
40	60	York	139·14	10·39	4·91	23·62

* Liverpool parish extends over part of the Mersey. Its whole area is 2,200 acres, ·82 should be

Towns of England in the Two Decades, 1841-50 and 1851-60—Contd.

7	8	9	10	11	12	13	14
Death-rate, Male and Female, 1851-60, to 1,000 of Population, Registrar-General, 23, 220.	Male Death-rate, 1851-60, of Population, Registrar-General, 23, 218, and Census, 194.	Excess of Females over Males per Cent., 1861, Census, 192.	Male Death-rate under 1 Year to 1,000 Births, Registrar-General, xiv to xxiii, and xxiii, 196.	Male Death-rate over 1 and under 5 Years. (Total of Four Years.)	Male Death-rate from Birth to under 5 Years. (Five Years.)	Proportion of Male Death-rate under 1 to General Male Death-rate.	Number of Male Deaths in the 4 Years over 1 and under 5, in proportion to 100 Male Deaths under 1.
26'34	27'30	6'99	205	136	341	7'51	67
26'88	28'60	7'42	194	133	327	6'78	68
25'69	26'89	15'59	205	126	331	7'63	61
22'00	24'99	34'23	174	111	285	6'96	64
26'71	29'68	16'00	177	136	313	5'96	76
—	—	23'18	—	—	—	—	—
17'50	21'15	73'50	—	—	—	—	—
19'00	20'78	38'20	156	83	239	7'51	53
22'21	23'27	4'63	156	98	254	6'70	63
25'27	26'73	11'52	224	113	337	8'38	50
24'08	25'33	11'60	172	111	283	6'79	65
25'82	26'23 {	minus 2'50 }	174	128	302	6'63	74
24'69	26'06	6'35	201	131	332	7'71	65
19'00	22'10	43'20	—	—	—	—	—
27'72	29'43	6'89	206	146	352	7'00	71
25'41	27'19	14'20	212	122	334	7'79	58
33'29	35'23	3'05	240	227	467	6'81	95
—	—	5'80	—	—	—	—	—
24'83	25'43	10'58	191	102	293	7'51	54
31'48	33'65	10'96	220	168	388	6'54	76
28'60	—	11'53	205	156	361	—	76
26'00	27'66	12'42	198	145	343	7'16	73
27'37	28'61	1'66	193	145	338	6'75	75
24'91	26'70	20'71	208	107	315	7'79	51
26'66	28'95	21'89	223	130	353	7'70	58
25'37	26'43	3'72	206	128	334	7'79	62
23'62	25'36	15'78	175	152	327	6'90	87
22'78	23'39	3'77	147	129	276	6'28	87
27'17	28'73	12'26	212	139	351	7'38	66
28'45	29'51	'97	196	151	347	6'64	77
24'45	27'49	12'50	171	119	290	6'22	70
25'62	26'87	13'99	204	114	318	7'59	56
24'89	25'98	5'46	170	132	302	6'54	78
27'61	28'45 {	minus 2'93 }	203	153	356	7'14	75
24'73	27'03	25'39	202	113	315	7'47	56
24'01	25'15	8'05	178	101	280	7'08	57

of which 1,560 acres are land, and 660 acres are water (Census 1861, I, 595). Therefore reduced to '58.

TABLE C.—*Vital Statistics of the Metropolis, and of its Principal*

1		2	3	4	5
Population, in Thousands, 1861, Registrar- General, 23, 6.	London and some of its Districts.	Acres to each 100 Persons, Registrar- General, 23, 6.	Increase per Cent. in 10 Years, Census, 1, 196.	Number in a House, Census, 1, 196.	Death-rate, Male and Female, 1841-50, <i>Including</i> Hospitals, &c. Registrar- General, XIII, 198.
20,066	England and Wales.....	186	11·93	5·37	22·28
2,804	London	2·79	18·70	7·80	24·55
66	Lewisham (W. W.)	26·04	88·77	6·77	16·51
19	Hampstead (W.)	11·79	59·40	7·20	17·27
88	St. George's, Hanover Square (H.)	1·32	19·86	8·41	23·61
35	St. James, Westminster (W.)	·46	{ minus 2·97 }	10·60	20·55
162	Marylebone (H. H.)	·93	2·53	9·88	23·89
23 {	St. Martin-in-the-Fields (H. and W.)	1·34	{ minus 7·92 }	10·13	25·77
43	Strand (H.)	·40	{ minus 3·24 }	11·39	23·27
129	Shoreditch (W. W.)	·50	18·40	7·58	26·65
58	Bermondsey	1·18	21·25	7·10	26·79
49	St. George's-in-the-East (W.) ...	·50	1·07	7·92	27·70
79	Whitechapel (H. H.)	·51	{ minus ·99 }	9·11	31·20
56 {	St. George's, Southwark (W.) and L. A.)	·51	7·11	7·67	28·07
54	St. Giles's (H.)	·45	{ minus ·25 }	11·53	25·18
27	West London (H.)	·51	{ minus 3·78 }	10·52	44·03
46	City	·95	{ minus 18·55 }	7·16	18·95
— {	Bethnal Green (H., W., and L. A.)	·72	16·53	7·13	24·19

Note.—(W.) means that there is a workhouse in this district ;

Registration Districts in the Two Decades, 1841-50 and 1851-60.

6	7	8	9	10	11	12	13
Death-rate, Male and Female, 1851-60, Including Hospitals, &c. Registrar-General, xxiii, 220.	Death-rate, Male and Female, 1851-60, Excluding Hospitals, &c. Registrar-General, xxiii, 220, and 83-4.	Death-rate, Male and Female, 1851-60, adding One-sixth to Column 7 for Deaths in Public Institutions.	Male Death-rate, including Hospitals, 1851-60, Registrar-General, xxiii, 222, and Census, I, 196.	Excess of Females over Males, 1861, per Cent., Census, I, 196.	Male Death-rate, 1851-60, under 1 to 1,000 Births, Registrar-General, xiv to xxiii, 102, and xxiii, 196.	Male Death-rate over 1 and under 5 Years. (Total of Four Years.)	Male Death-rate from Birth to under 5 Years.
22·24	—	—	23·05	5·25	161	105	266
23·77	—	—	25·70	14·48	161	137	298
16·75	16·01	18·67	17·97	9·96	135	104	239
16·00	14·78	17·24	19·15	60·58	134	116	250
20·85	16·15	18·84	25·25	33·50	147	122	269
21·49	18·28	21·33	22·23	12·10	166	147	313
23·71	19·37	22·60	26·22	30·00	176	136	302
25·97	18·60	21·70	27·95	7·15	170	157	327
23·67	20·09	23·44	25·87	7·05	164	170	334
24·23	20·69	24·14	25·26	8·66	157	134	291
24·84	24·84	28·98	25·32	3·39	161	159	320
27·10	23·57	27·50	27·84	6·78	174	159	333
30·41	22·68	26·46	32·41	{ minus 1·82 }	191	175	366
25·83	22·46	26·20	26·61	5·46	188	153	341
26·68	21·43	25·00	28·75	12·47	187	163	350
44·98	20·87	24·35	51·38	2·47	188	248	436
17·67	17·67	20·62	19·10	10·34	140	144	284
22·26	19·63	22·90	22·98	3·51	156	139	295

(H.) that there is a hospital; (L. A.) that there is a lunatic asylum.